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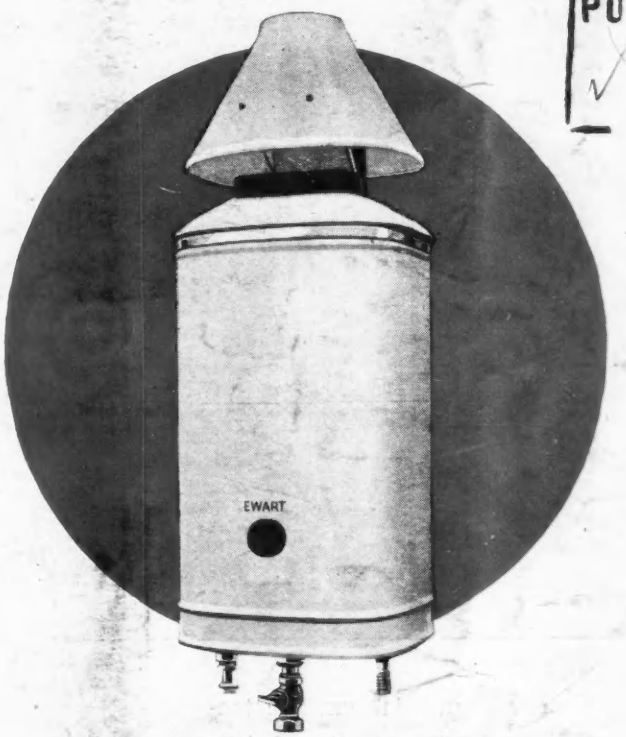

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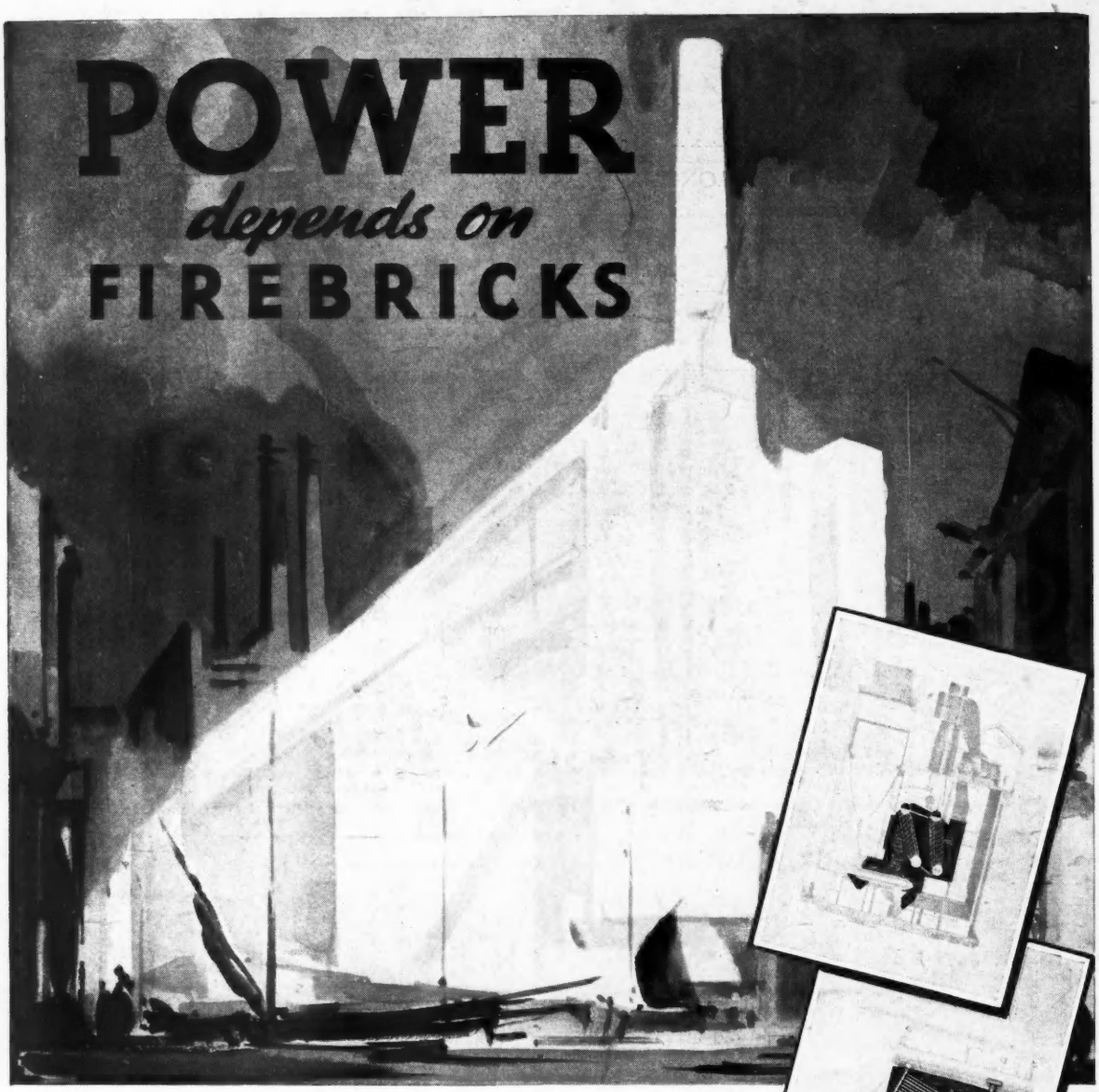

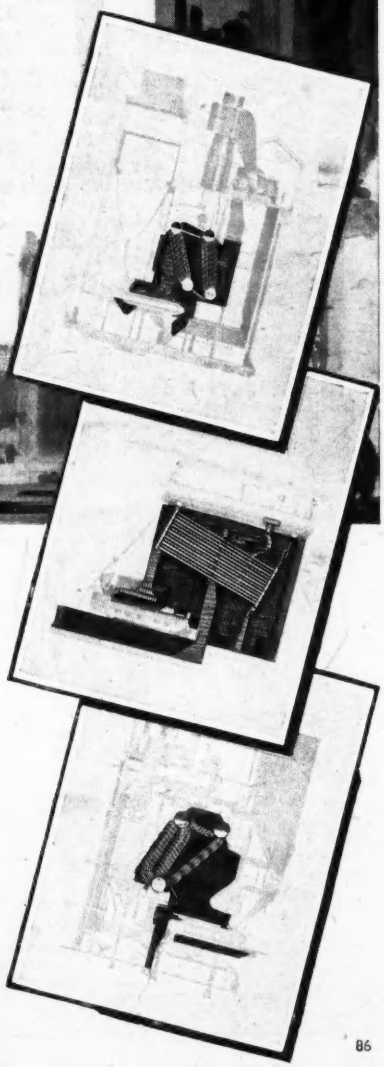

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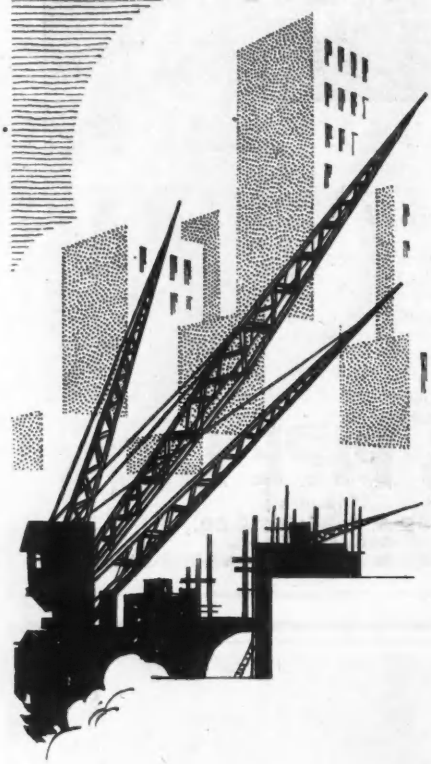

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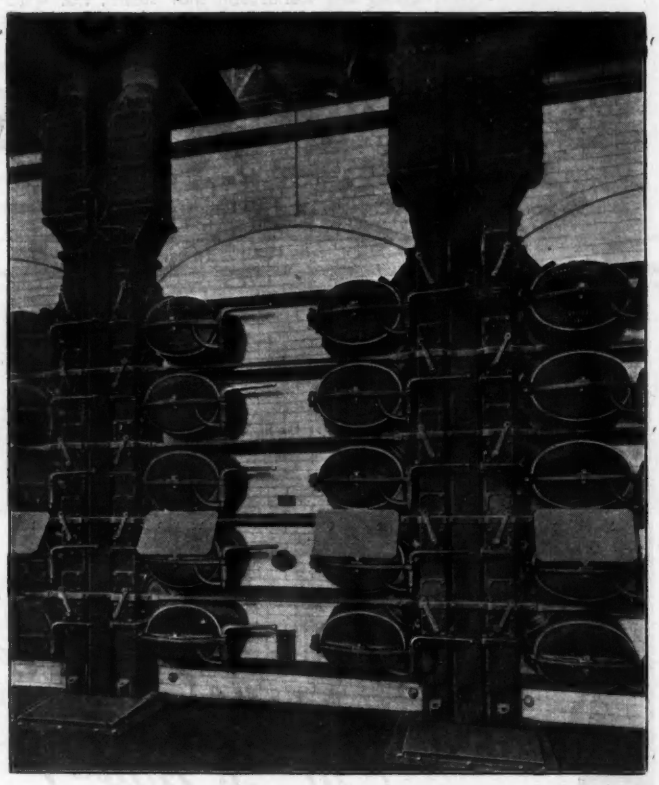

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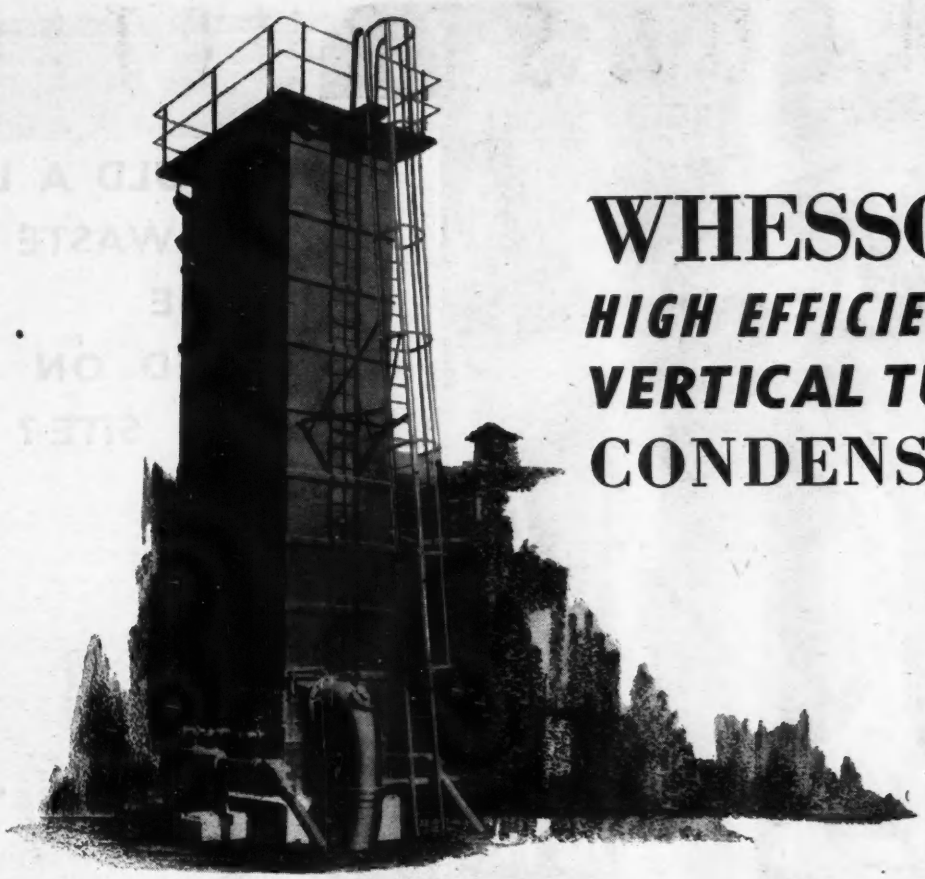

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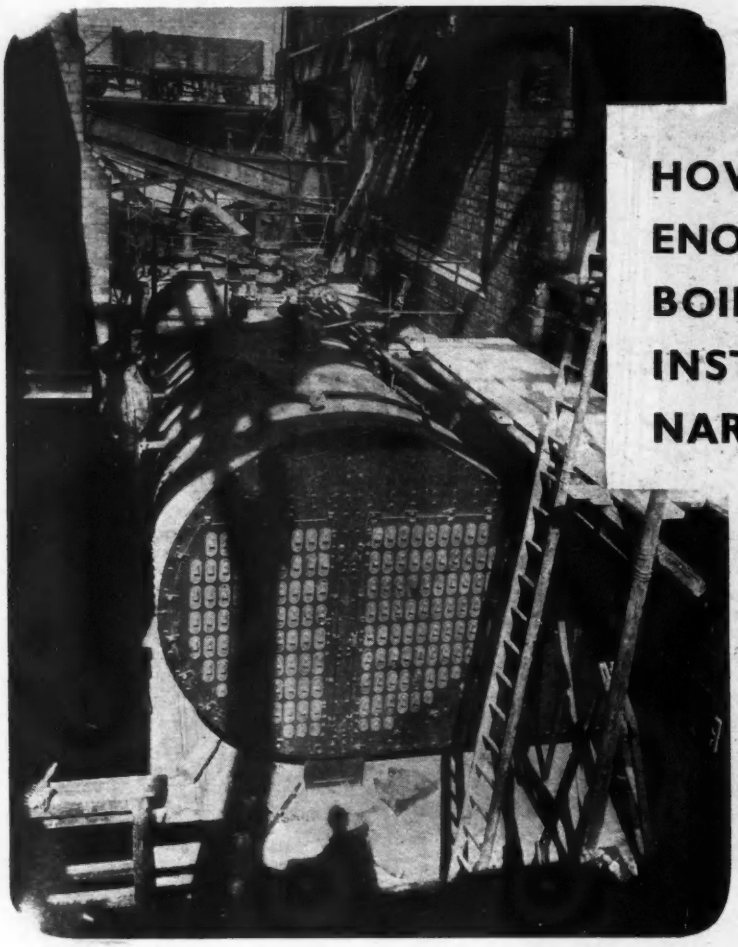

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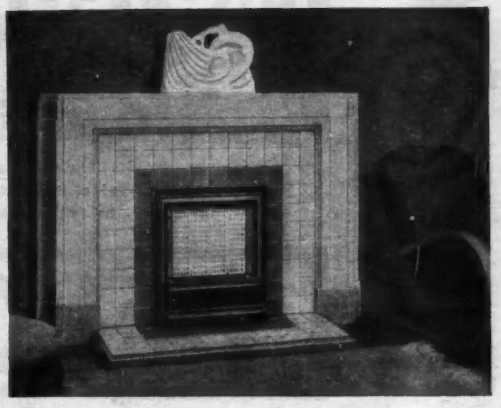

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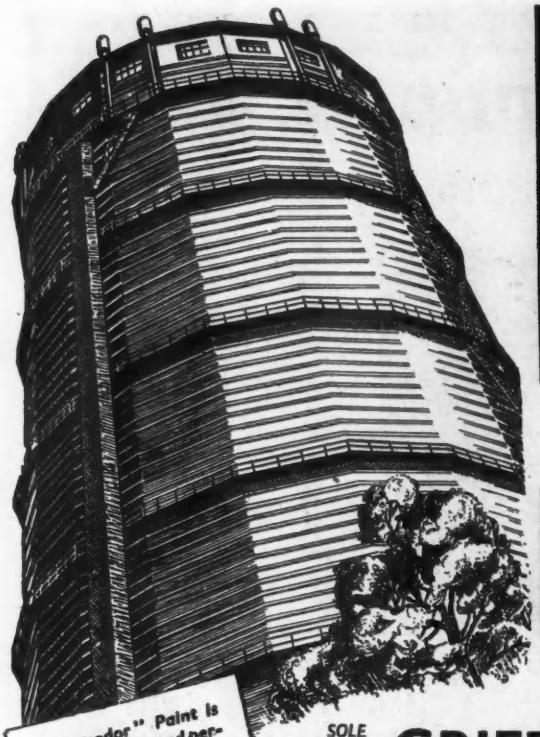

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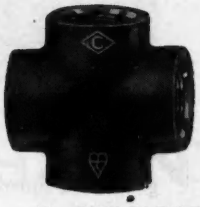

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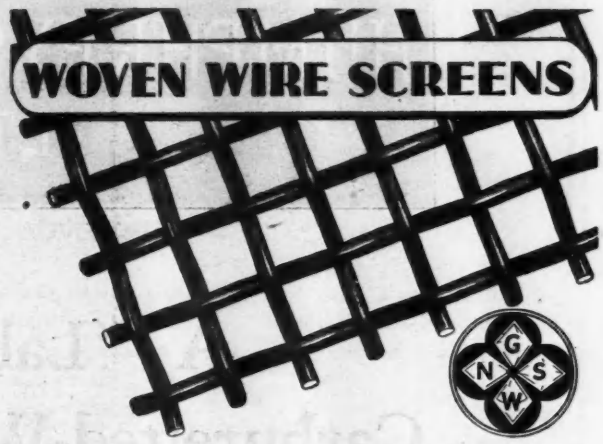

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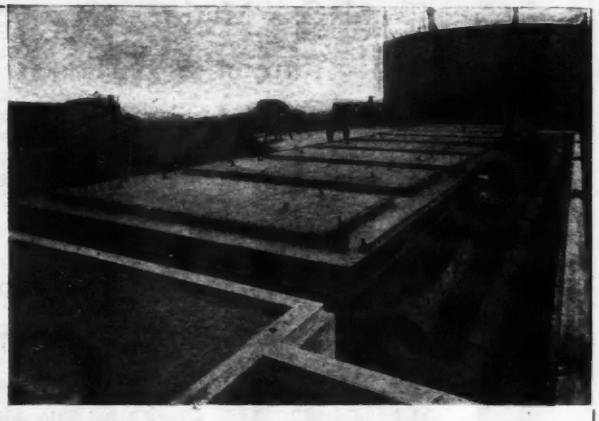

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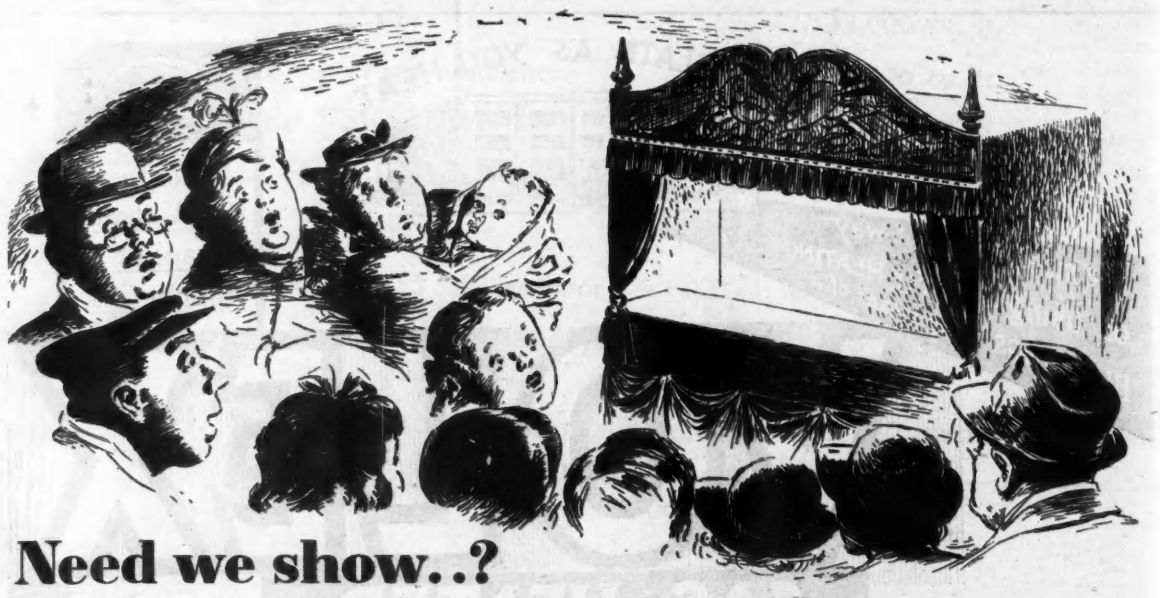

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GAS JOURNAL, JAN. 24, 1945

VOL. 245 97th YEAR No. 4262

EDITORIAL NOTES

THE MERGER

WHEN, a week ago, we discussed with enthusiasm the joining of forces by the National Gas Council and the British Commercial Gas Association, the news had only recently been given to us. After a week's contemplation we are, if anything, still more enthusiastic. Perhaps we are cautious by nature; at any rate we like to check up, and all our enquiries strengthen the hopefulness with which we described the situation last week. There is quite evidently a determination in the Industry, as represented by the now joint executives of the two bodies, to square up to the dangerous situation which had gradually developed and has for some time been threatening to come to a menacing head, and to back Mr. Sylvester and his Committee in whatever measures they deem necessary. We have every reason to believe that they will organize with the offensive in view, and not with any notion that the Industry requires strengthening merely in order that it may be kicked the harder. As we suggested last week, there remain among us the cynics. For example, our "fan" mail contained the remark of a candid friend who, having read our comment on the new set-up, called it, "A nice piece of writing. But shall we now really have a gas free of organic sulphur?" Which, even if it implies that our advocacy is stronger than our case, incidentally underlines the importance we noted in that comment of organizing along technical as well as purely administrative lines, and still more the urgency of passing from the advisory system, under which the Gas Industry has procrastinated so solemnly for so many years, to the more profitable stage of actually putting oft-accepted advice into practice.

The need for constant vigilance against backsliding into bad old ways calls attention not only to the desirability of investing small committees with executive rather than advisory powers, but also of considering the appointment of a whole time director, as was envisaged by the Planning Report. Even if the British Gas Association, in the shape in which it was conceived, eventually proves to have been a stillborn child of that report, it is reasonable to hope that the present merger of the N.G.C. and the B.C.G.A. may be the nucleus of a pool, in some shape or form, of still wider resources of the Gas Industry. If events develop in that direction, a wealth of material which has accumulated in the past year will be at the disposal of the sponsors. At all events the can's and the can'ts of the constitutions so beloved of gas bodies have all been thoroughly investigated, and the situation of the major obstacles has been reconnoitred and recorded, so that much preliminary work, it may be said, has been done. All the same, we shall be well satisfied if this is regarded as a more distant objective, there being work enough at hand without being too ambitious. A director, however, is not the monopoly of an unformed British Gas Association, and no doubt the advantage or otherwise of such an appointment will very early be considered by the Organization Committee. Unfortunately directors of the kind envisaged do not ply for hire at every street corner. The difficulties of a choice from the present ranks of the Industry are clear enough. Yet what a pity when the urgency of mobilizing the Industry is considered, and the speed with which a director could get to work who already understood the problems. Is it worth while to make one more desperate search? Could some formula, as they call it in international politics, be devised for inviting applications? Whatever the outcome of the Committee's deliberations on this subject, we do urge that no attempt be made to hustle the members. In many facets of the Industry's reorganization big risks are justified in preference to continued inaction, but as little chance as possible must be taken of a mistake in the selection of a director at Headquarters.

§§

One of our most pressing needs, as a correspondent points out in this issue, is the resumption of public relations in the fullest sense of the term. No one man can fulfil for our Industry all that the term implies, but it is worth consideration, if one is to be selected as the focal point of such activities at Headquarters, whether it would be advisable to give him a title other than public relations officer. After all, there is no real need to invite attention, by the announcement of such an appointment, to the fact that for five or six years we have almost studiously avoided the cultivation of such relations. Apart from that, and without the slightest disrespect to thousands of P.R.O.'s who are doing splendid work in many Government and commercial spheres, recent questions in the House and elsewhere have tended to detract from the prestige attached to the title. In much the same way "salesmanship"—as a name, not as an accomplishment—had its years of glory, and then by overstressing lost heavily in repute, and now, we believe, we are to have gas service men rather than salesmen. What's in a name? A small point, perhaps, but we put it up for consideration whether the P.R.O. by any other name might not find that he was starting his job with certain advantages.

ELECTRICITY AND NEW HOMES

LOCAL housing authorities are now getting busy about the provision of temporary domestic dwellings. Sites are being agreed upon, allocations are being considered as regards the number of these temporary structures, and recommendations are being made concerning the heat services—for cooking, water heating, and room heating, refrigeration, and laundry—to be installed. Since the war there have been innumerable questionnaires from a host of very varied societies and organizations addressed to the housewife, asking her what she would like after the war, and among the questions those relating to domestic heat services have figured largely. To what extent these—or some at any rate of them—have been flavoured either with blatant or subtle propaganda or have savoured strongly of political views and aspirations we are not prepared to discuss here. On some of these questionnaires we have commented in these columns, and many of them have seemed to us highly impractical. It is easy to pose questions in such a way as to make it tolerably sure of obtaining the reply one desires. We ourselves would like many things, but we doubt whether we should get them by answering a vague or childish question in the affirmative, by writing yes on the dotted line. These questionnaires, however, have undoubtedly had influence, though, again, exactly how much influence we are not prepared to say. We do see—and this is the point we would stress—a strong bias on the part of housing authorities favouring the installation of electricity to the exclusion of gas, and apparently without due consideration of ultimate economics and ultimate fuel conservation and right usage in the national interest.

During the cold weather of Christmas time and the early part of the New Year we have had grave warnings and threats of deprivation of electricity supply at certain hours of the day made by the Central Electricity Board and the Ministry of Fuel and Power. This due to the overloading of the grid as a result of domestic consumers superimposing their loads on industrial demand. As has been stated in electrical circles, the margin between plant capacity and demand has so diminished that it threatens to disappear if large numbers of electric fires are switched on in the early morning. The electrical industry has no storage capacity, and this anxiety over peak load is not to be regarded as a purely wartime phenomenon. It is freely admitted that the last pre-war cold snap stretched generating capacity to

the limit. In the years before the war there was much discussion on the avoidance of excessive peak loads by controlling the times at which domestic consumers could in fact have electrical supply, and this discussion has continued since; it seems likely to continue. We quote from the *Electrical Review* of Jan. 12: "Industry must be served first, and therefore it is the smaller consumers, mainly domestic, who must be cut off to keep things running. But what will the position be in peacetime? Full employment means maintenance of the industrial load at quite as high a level as is now being experienced. In sudden cold weather there still will be that clash of demands from factories and homes. Is there then a danger that even in peacetime it will be necessary to implore the public to keep off the peak?" And our contemporary went on to say: "The supply industry will never persuade housewives to have their breakfast and warm their rooms before the factories start up, or wait until the industrial peak is over before doing these things. . . . It seems that only by increasing the amount of marginal plant can the difficulty be surmounted. But this is uneconomical." The sting is in the tail. In the meantime every effort is being put forward by the electrical industry, and too obviously with temporary success, to install electricity exclusively in temporary dwellings. It has been suggested that when the occupiers of these dwellings get their bills for electric current consumed there will be a movement to have electrical appliances taken out and replaced with more economical and equally convenient equipment using alternative fuel. This argument does not appeal to us; replacement is quite a different matter from initial installation. Nor are we so certain in our mind whether in the outcome the temporary dwellings themselves will be as temporary as it is planned at the moment they should be.

There can be no doubt that the Central Electricity Board's grid has been enormously useful in the expansion of the electrical industry, the output of which has doubled every seven years since 1913, and is now 16 times what it was in 1914. In the early 1930's, due to large-scale generation and the interconnexion of mains, economies were brought about and supplies of electricity made available which would otherwise in all likelihood have been impossible of achievement. During the war, factories in South Wales have been supplied, through the grid, with electricity generated in the London area from coal mined in South Wales—an expansion of the grid system financed by the Treasury. As recorded in the "JOURNAL" at the time, a five-year plan undertaken by the Central Electricity Board—a plan described as "the biggest expansion programme on record"—was announced at the end of last November. A programme of new generating stations and extensions of existing stations comprising an aggregate of over 3,000,000 kilowatts of new plant and covering the period to the winter of 1948 contemplates an expenditure of over £90,000,000. Such facts have to be faced by the Gas Industry—and there is no question of a "truce" between gas and electricity in new housing. Regarding the ultimate cost of electricity to the domestic consumer, the electrical industry seems to be satisfied with saying to itself, "On with the load, whatever eventuates." Before the end of the war we find ourselves once again well and truly in the competitive arena.

It is not that the Gas Industry has not a good case for the adoption of gas in new dwellings, temporary and permanent alike. The Industry's demonstration at Northolt is a fine example of what the Industry can offer in domestic fuel service, and there are plenty of other equally telling examples throughout the country. From the national aspect, the conservation of coal and the supply of raw materials essential to the chemical industry, the Industry has a process which should have first appeal to scientist and economist alike. From the point of view of economy in the home, the Gas Industry's case should be as unassailable as it is generally favourable. Are hopes, held and expressed during the war and before it, of the use in the national interest of those fuels demonstrably best suited for particular purposes, taking all in all, to be dashed? For the moment at any rate there is no guidance from the Ministries concerned with housing and fuel utilization in these houses. Why is it that, with so many advantages in its favour, the Gas Industry has failed so far to make the best of its case and apparently has won little added popular favour, the while there seems to be a clamour for electricity? If we hold a view too pessimistic and too gloomy, we are open to correction, and in fact would heartily welcome such correction. But certain of the reports which reach us of the meetings of housing committees and the like from various parts of the country are not to us a source of wild optimism. At this time of day the position as a whole seems to us more chaotic than otherwise, and we find it difficult to understand and difficult to reconcile with any rational fuel plan. The proportion of electricity supply municipally owned is greater than that of gas supply similarly owned; and this may have a not inconsiderable bearing on the situation. But we hear of decisions of the utmost moment to the housewife who is to occupy new temporary or permanent dwellings being arrived at without any consultation with the Gas Industry—*i.e.*, the gas undertakings concerned. And it seems to us that many housing committees are lightheartedly and irresponsibly pro-electric, and in many instances the idea of "freedom of choice" has scant appeal. Of national importance, the whole problem is of particular concern to the Gas Industry and is, we think, one of urgency. The Industry has no cause to seek special favour, but it may well ask itself to what extent the current wave of enthusiasm for electricity is the result of the Industry's comparatively poor showing, *vis-à-vis* electricity, in gaining the public ear, its seeming desire to evolve slowly rather than rapidly and, perhaps, its tendency, in general, to eschew dramatic appeal.

THE EXHIBITION

EVER since gas came into common domestic use the need for some sort of kitchen planning has been recognized by the Gas Industry, and for some years it has been a matter of special study by committees of the national bodies, enterprising undertakings and groups of appliance manufacturers. Eighteen months ago, when post-war planning was very much to the fore, the widespread and varied kitchen research activities of the Industry were correlated and co-ordinated by the formation of the Domestic Heat Services Committee, whose members were drawn from the commercial and technical sides of both the supply and appliance branches of the Industry, and whose terms of reference were "to give practical application in a co-ordinated manner to the work of the various central committees within the Industry covering all domestic uses of gas and coke, and to guide the advocacy and use of domestic gas and coke appliances in relation to publicity, representations to local authorities or Ministries, and the arranging of model kitchens and exhibits throughout the country." The appointment of the Committee was a big step towards collaboration with architects and builders, and soon led to close co-operation with the responsible Government Departments and housing authorities. The Committee took its job seriously, and with the help of its Architect Consultant produced plans for kitchens to suit all types of homes, new or converted, for families of varying sizes and income levels. It came to be accepted in official quarters as the voice of the Industry on domestic gas matters, and has made its impression on all the different proposals for temporary and permanent building in the immediate post-war years, as exemplified in the Portal house, the Northolt houses, the Building Equipment Exhibition, and elsewhere.

Separate undertakings in increasing numbers have run their own model kitchen displays, while the Committee has been preparing its Kitchen Planning Exhibition so that the world may know what sort of contribution the Industry as a whole proposes to make towards post-war housing needs. As announced last week, the Kitchen Planning Exhibition has now been arranged to take place at Dorland Hall, London, from Feb. 5 to Mar. 3. It was originally intended to hold it last June, but D Day took preference in the national calendar, and the war situation caused a further postponement from the autumn. Whether or not February is an ideal month for such an exhibition we do not know, but the arrangements are such as to deserve success if not to command it. The layout of the ten

different types of kitchen, with "package" kitchens that can be delivered in one or two parts and erected in a very short time, and the application of unit construction, prefabrication, and interchangeable standard fittings, are intended primarily for the enlightenment of housing authorities, architects, and builders, but they will be of fascinating interest to the potential users—the general public—and it is certain that the Committee will itself learn much from the comments and criticisms of those who visit the show. For instance, it will be interesting to know what the average housewife who has been accustomed to a vertical cooker thinks about the horizontal variety.

It is unlikely that the entire exhibition will afterwards tour the provinces as was at one time contemplated, but miniature models are being made of all the kitchens, and these can either be shown direct, or used as patterns for full-scale reproduction wherever desired. The Kitchen Planning Exhibition is a national effort, and local habits may call for slightly different ideas in distant provinces, so that it may be left to the districts to carry on their good work on their own lines, with the London show as their main background.

Personal

Mr. D. H. Helps

After the long period of 41 years as Engineer and Manager of the Reading Gas Company, Mr. DOUGLAS HELPS retired at the end of last year. Mr. Helps started as a pupil to his brother, Mr. J. W. Helps (Birmingham Gold Medallist, and President both of the old Institute and the present Institution of Gas Engineers), first at Weston-super-Mare and then at Croydon, and in 1884 he was appointed Assistant Engineer to the Croydon Gas Company. During his 15 years with this Company the capacity of the works and the consumption of gas were more than doubled. In 1898 Mr. Helps went as Engineer and Manager to Redhill, where a large increase in the output of gas soon necessitated considerable alterations and additions to the plant. From Redhill Mr. Helps went to Reading.

During his time at Reading, the output of gas has increased by 353%—a remarkable tribute to efficient management. The incandescent gas mantle, invented in 1886, had already displaced most flat-flame burners in private houses, and one of Mr. Helps' first steps at Reading was to improve the street lighting of the Borough by the general adoption of incandescent lamps. During his time there he has modernized and greatly extended the works, and it is not too much to say that in its conception, layout, and appointment, the Reading Gas-Works is among the finest in the country.

Mr. Helps has been a member of the Executive Committee of the National Gas Council since its formation in 1916. He was elected to the Committee of the Gas Companies Protection Association in 1906, and has been a member of the Executive Committee of the B.C.G.A. since 1911. On the formation of the Conjoint Conference of Public Utility Associations, Mr. Helps was appointed as one of the representatives of the G.C.P.A.

In his early years Mr. Helps was an athlete of outstanding ability, shining especially in cross-country running and Rugby Football. He was captain of the Croydon Club for five years, in the Surrey County side for many years, and in English trials, playing in North *v.* South matches. Among other hobbies he has been all his life an enthusiastic fisherman. Everyone will wish Mr. Helps many years of ease in retirement and good fishing, and will hope that he will continue to take an active interest in the Industry which he has served in so distinguished a manner for so many years.

Mr. Helps is succeeded at Reading as Engineer and General Manager by the Deputy Engineer, Mr. F. G. SYMON, A.M.I.Mech.E. Before going to Reading Mr. Symon was with Messrs. Henry Balfour & Co., Ltd., Leven, the Wemyss Coal Company, and the gas undertakings of Glasgow, Motherwell, Wishaw, Coatbridge, and Stretford. He received his early education at the Buckhaven High School, and his technical training at the Herriot Watt College, Edinburgh, and the Royal Technical College, Glasgow.

* * *

Mr. T. R. SEWELL, M.C., B.Sc., has been elected Chairman of the Sunderland Gas Company in place of Mr. T. S. Short, J.P., deceased. Mr. C. C. WALMSLEY, F.C.I.S., General Manager and Secretary, has been elected as Director to fill the vacancy on the Board.

* * *

Major P. J. WILKINS, of the 2nd Battalion, The Essex Regiment, has been awarded the Military Cross for conspicuous gallantry. Major Wilkins was, until the outbreak of war, a representative of Fletcher, Russell & Co., Ltd. (Radiation Ltd.) in the London Area, and is the elder son of Mr. Percy Wilkins, the London Manager of the same Company.

* * *

Mr. WILLIAM CHERRINGTON, Works Superintendent at Bilston Gas-Works, was recently presented with a long service certificate and savings certificates to mark the completion of 50 years in the employ of the Company. The presentation was made at a Board Meeting by Mr. Leslie W. Lee, the Chairman.

* * *

Mr. SAMUEL TAGG, C.B.E., J.P., Deputy-Chairman and General Manager, has been appointed Chairman of the Preston Gas Company.

* * *

Mr. LAURENCE NICOL, Works Superintendent at the Inchgreen Works of the Greenock Gas Department, was honoured last week by his colleagues at Inchgreen on the occasion of his retirement after 27 years' service with the Corporation. Mr. Robert Keillor, Engineer and Manager, presided at a social gathering and referred to Mr. Nicol's valuable contribution to the successful working of the Corporation Gas Undertaking. Councillor Brotherstone, Chairman of the Gas Committee, also spoke of the good work done by Mr. Nicol, and presented him with a silver biscuit tray from the Gas Department, and a wallet of Savings Certificates from the employees.

* * *

After 47 years' continuous service, Mr. SIDNEY F. CHAMBERLAIN has retired from the staff of Thomas Glover & Co., Ltd. A son of the late Mr. H. B. Chamberlain, who was for many years Secretary to the British Gas Light Company, Mr. Chamberlain is well known to the Gas Industry, particularly to the older generation of gas engineers in the Eastern Counties. As a mark of appreciation of his loyal service, the Directors have presented him with an inscribed silver salver. His colleagues also marked the occasion by making a presentation, and joining in expressions of hope for a long and happy retirement.

Obituary

Sir Reginald Clarry

The death occurred on Jan. 18 of Sir REGINALD G. CLARRY, M.P., at the age of 62. Sir Reginald Clarry (a son of the late Mr. George Clarry, who was General Manager and Secretary of the Cardiff Gas Company) started his career in the secretarial department of the Cardiff Gas Company, where he spent a few years before undergoing a course of workshop training with R. & J. Dempster, Ltd., at Manchester. This training completed, he became an articled pupil at the Beckton Works of the Gas Light and Coke Company, and after his term went through a course in the distribution and sales departments of the Company. Next he was appointed Works Superintendent at the Grangetown Station of the Cardiff Gas Company. After a short time there he went back to the Gas Light, becoming Deputy Engineer at the Shoreditch Works. He left London in 1908, having obtained the position of Assistant Engineer and Manager to the Swansea Gas Light Company. Five years later he was appointed Engineer, Manager and Secretary of the Company, a post he occupied up till 1919, when he resigned it on being appointed Managing Director of the Duffryn Steel and Tinplate Works, Ltd., in which year he was President of the Wales and Monmouthshire Association of Gas Engineers. During the 1914–1918 war he did good work in an advisory capacity at the Ministry of Munitions.

It was in 1922 that he stood as independent Conservative for the Newport Division—a constituency that had always been Liberal. His prospects, against both Coalition and Socialist candidates, appeared hopeless. He won the seat by a substantial majority. In a few hours of this victory the Coalition Government collapsed. Three General Elections followed in quick succession; in each Sir Reginald Clarry was successful. He fought and won four Parliamentary contests in two years, holding the seat till the General Election in 1929. In 1930 he was appointed Chairman of the British Road Tar Association, a position he occupied for some years. In 1931 he regained his seat in Parliament and represented Newport until his death. He received the honour of knighthood in 1936.

Diary

Jan. 26.—London and Southern District Junior Gas Association: Gas Industry House, 6.30 p.m. Paper by J. H. C. Bates.
Feb. 1.—I.G.E. Board of Examiners: Gas Industry House, 11.30 a.m.
Feb. 7.—Southern Association of Gas Engineers and Managers (Eastern District): Gas Industry House, 2.30 p.m. Paper by T. Brown (General Manager, South Suburban Gas Company), "Housing Developments and the Gas Industry."
Feb. 19.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m., Gas Industry House.
Feb. 23.—Institute of Fuel: Joint Conference with National Smoke Abatement Society.
Feb. 24.—Manchester and District Junior Gas Association: Address by Dr. J. G. King, Director of the Gas Research Board.
Feb. 24.—Yorkshire Junior Gas Association: Meeting at Bradford. Paper by A. Cole.
Feb. 28.—Institute of Fuel (North-West Section): Conference on Preparation of Coal. Engineers' Club, Manchester, 10.30 a.m.
Mar. 21.—Southern Association of Gas Engineers and Managers (Eastern District): Gas Industry House, 2.30 p.m. Paper by J. E. Davis (South Metropolitan).
Mar. 22.—Midland Counties Coke Association: Annual Meeting, King Edward House, Birmingham, 2.30 p.m.

Letters to the Editor

The Industrial Gas Load

DEAR SIR,—I have read with interest your editorial under the heading "Industrial Gas Load" published in the "JOURNAL" of Jan. 10.

I feel that your comments come at an opportune moment, and that your criticism of the scheme in general is well informed and constructive. The intended functions of the Centres were clearly enunciated in the 1933 Memorandum of the Joint Co-Ordinating Committee, and what you are now trying to do, to some extent, is to compare the present position of the Centres with that intended for them in this Memorandum.

I can only speak as Chairman of the Yorkshire Centre, and please understand that what I am saying is a personal expression of opinion based upon my experience in the above capacity. Your remarks about the appearance of industrial equipment are quite justified, and I am sure this opinion will be endorsed by representatives of other Centres also. Much leeway is to be made up in the architecture of this equipment, and here, perhaps, the Industrial Gas Centres Committee could be of assistance, particularly if they work in co-operation with the furnace builders.

I should like to pay tribute to the work of the Gas Light and Coke Company along these lines, particularly in connexion with the design of their latest infra-red unit.

The Yorkshire Centre differs from the other Centres in being a separate Undertaking; it is not based upon any Gas Department or Company, and operates entirely for the benefit of its members. It may be of interest to you to know that quite recently we formalized our constitution and became a Company Limited by Guarantee. In this way control of the Centre is actually in the hands of its members.

Your remarks about the facilities and accommodation of the Industrial Centres as a whole apply to this Centre, and we recognize it. Being a separate Undertaking our income is limited to approximately £2,000 per annum. The entire staff of the Centre numbers four, office accommodation is rented from the Leeds Corporation Gas Department, while laboratory facilities are available on a similar basis at the University of Leeds by kind co-operation of Professor D. T. A. Townend.

In membership the Yorkshire Centre is one of the largest, having nearly 60 contributing undertakings, and at times the Centre is hard pressed to fulfil the demands made upon it. In spite of this, however, we have managed to make some progress.

The ability of the Gas Industry to retain and expand its industrial load will depend largely upon the efficiency and flexibility of its appliances. It is to this end that our Centre had endeavoured to make some small contribution in the shape of the permeable lining development, and, also, we have made some progress with the application of radiant heating to drying processes. We have several other developments on the way, but I have to admit that our facilities and staffing are inadequate to deal with these matters as expeditiously as one would like. However, the Yorkshire Centre is endeavouring to expand its interest in facilities along the lines which you suggest in your editorial.

Yorkshire Industrial Gas Centre, Ltd.,
Meadow Lane Gas-Works,
Leeds, 11.
Jan. 16, 1945.

Yours faithfully,
C. S. SHAPLEY,
Chairman.

Publicity

DEAR SIR,—The lack of an adequate publicity organization in the Gas Industry to organize effective public relations work is being much criticized in various quarters.

In years gone by the Gas Industry's publicity activities were recognized in the commercial world as being second to none. You will readily recall some of the more outstanding personalities—Mrs. Cloudesley-Brereton—a genius who over 20 years ago placed ideas before the Gas Industry, some of which are only now being introduced into the business world as revolutionary innovations. Then there was Sir Francis Goodenough, whose advocacy of improved sales methods took the Gas Industry into the front line of big business. Later, the work of men experienced in publicity methods—T. W. Coghlin, A. P. Ryan, S. C. Leslie, and others—was rewarded by a general awareness of the value of gas service in the life of the community. But the war has carried us downhill—for an obvious reason. No first-class brain should be engaged on the future problems of peace when the immediate problems of war have to be solved. The war has yet to be won; therefore the appointment of suitable personnel under the Ministry of Labour and National Service restrictions cannot be an easy task.

And yet, from a recent statement in the House by the Financial Secretary to the Treasury, it is known that 4,396 (exclusive of clerical and secretarial staff) people are employed in the Public Relations and Press departments of various Government offices to keep us abreast of events and conscious of our duties. Perhaps the second biggest public utility in Britain could attract to itself someone good out of the 4,396. I note that the electricity industry has managed to secure the services from the Ministry of Food of one of its publicity men.

I see in my newspapers that the Gas Industry is doing some advertising, but this should be livened up and supplemented by editorial stories. Commercial firms and big industrialists value the news columns of the newspapers more than the space they can buy as straightforward advertising, and they try hard to become news. This must be well done, and it requires a flair and an experienced knowledge of journalism to dress up the material for the suitable column. A glance through recent issues of your "JOURNAL" discloses no lack of items suitable for the news columns of our breakfast literature; for instance some aspects of the story on the Ministry of Works' demonstration houses at Northolt ("G.J.," Nov. 29, 1944); then the story about the Balloon Barrage ("G.J.," Dec. 13, 1944).

It is a shame that this really exciting piece should be restricted to a technical journal with a specialist readership; every member of the public who has seen a balloon would be interested. Need it be mentioned that the "appointment of Mr. A. E. Sylvester to be Chairman of a Joint Governing Body of the Gas Industry" presented a heavensent opportunity for the publicity wallahs to broadcast the ramifications of the Gas Industry—invested capital of £238 millions, employer of 250,000 persons and so on—to give a message to the 11,390,738 gas consumers, to state policy to interest the owners of the £238 millions? I am one of them, and I made an enthusiastic search of the newspapers for a reassuring message—but without success.

This Public Relations business with its role of propaganda is likely to be a major social force in our national life. All the problems of reconstruction can be smoothed by the judicious use of propaganda. The developments in education and the spread of an enlightened curiosity about all factors that touch the lives of the people seem likely to reinforce this instrument's growth. The Gas Industry must be prepared.

Yours faithfully,
"SHAREHOLDER."

Salaries of Gas Engineers

DEAR SIR,—I have noticed recently in the news columns of your "JOURNAL" reports of the decisions reached by a few Local Authorities regarding the Lancashire and Cheshire Provincial Whitley Council's application for the approval of the principle of a joint reference in order that the Whitley Council can proceed to negotiate a suitable salary scale with this Association.

At the time of writing I can advise you that seventeen Local Authorities in this North-Western Region have approved of this principle, and this number constitutes a majority of the replies which have already been received.

Also, I am sure it will be of interest to your readers to know that this Association has already a membership of more than 90% of those municipal gas engineers who are eligible, and that we are exploring all possible avenues with a view to obtaining by joint negotiation a marked improvement of the present most unsatisfactory salary position.

Association of Municipal Chief Gas Engineers and Managers (North-Western District), Gas-Works, Colne.
Jan. 15, 1945.

Yours faithfully,
A. H. NICHOLSON,
Hon. Secretary and Treasurer.

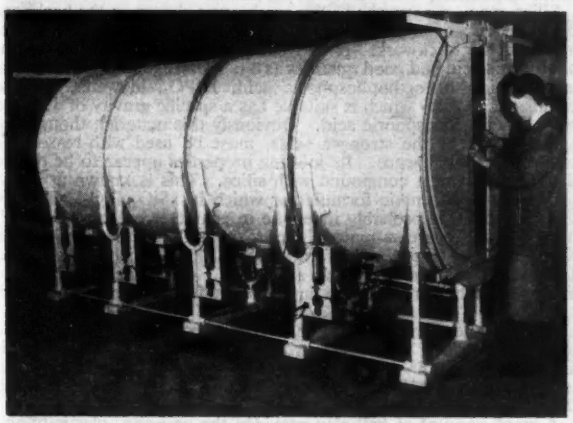
"Thermal Efficiency" is the title of a brochure published by the Tunbridge Wells Gas Company. It is a most attractive booklet, well written and amply illustrated, giving a series of schemes for modern kitchen layouts, showing how admirably gas fits into the picture. In a foreword Mr. J. W. Townsend, the Engineer and General Manager, expresses the hope that it will contribute to the solving of some of the many problems confronting architects and builders to-day.

The Institution of Chemical Engineers has published a detailed report on a "Degree Course in Chemical Engineering." In this the Council states that a substantial extension of existing facilities for chemical engineering of a university standard is highly desirable, and that university courses in the subject are most satisfactorily and logically conducted in the Faculty of Engineering. It is emphasized that the several parts of the course should be arranged and treated so as to form integral parts of a unified scheme.

There is a Possibility, we understand, that in the near future the Buckhaven and Leven Gas Undertaking may acquire the Kennoway Undertaking, and that the area at present supplied by two centres will be served by one. If the proposal comes into being it is envisaged that the County Council will play a contributory part, and that it will be represented on the Board of Commissioners. The proposal was brought to light at a meeting of the Fife Weights and Measures Committee in Cupar recently, by a note from the County Clerk, Mr. J. M. Mitchell, on a meeting held with representatives of the Buckhaven and Leven Gas Commissioners on Dec. 20. According to this, Baillie Nairn, Leven, had reported that the Buckhaven and Leven Gas Commissioners had had an application from the Kennoway Gas Company for a bulk supply. The note pointed out that, while they were prepared to augment their supply, the cost of gas in the burghs was 4s. per 1,000 cu.ft., whereas the cost of gas supplied by the Kennoway Gas Company was 5s. 7d. per 1,000 cu.ft. The proposition for consideration by the County Council was whether there should be co-operation between the County Council and the burghs concerned to (*a*) acquire the Kennoway Gas Undertaking, and (*b*) supply the whole area at present supplied by the two concerns from a sole centre. It was agreed that the proposal should be passed to the Convener's Committee for further examination.

Appearance with Efficiency

In an editorial comment in our issue of Jan. 10 we referred to the need for paying attention to attractive appearance as well as thermal efficiency in the design and finish of industrial gas equipment. Our photograph shows a unit—a gas-fired infra-red black emitter developed by the Gas Light and Coke Company in their Industrial Laboratories at Watson House—embodying these desirable characteristics. Cleanliness of design and fitness for purpose are well exemplified by this piece of industrial gas equipment, now being marketed by Matthew Hall & Co., Ltd.



View of a 4-ft. diameter, 12-ft. long infra-red black emitter tunnel combining attractive design and finish with thermal efficiency.

The unit is adaptable over a very wide range of drying temperatures and drying times. The intensity of radiation can be varied simply by the operation of the tap regulating the gas supply, and different temperatures can be maintained in various parts of the same drying tunnel to give quick initial partial drying and to complete the drying at a lower temperature, or *vice versa*, and can be readily and speedily adjusted to very fine limits.

For general utility purposes the standard units consist of two semi-cylindrical radiating surfaces heated by enclosed gas burners. These standard units are manufactured in three sizes, 2 ft., 3 ft., and 4 ft. diameters. The sections, which are 3 ft. in length, may be bolted together to form a tunnel of any desired length. Each 3 ft. section maintains its independent gas burners and controls, so that the radiation intensity can be adjusted along the length of the tunnel as previously mentioned. Any number of units can be controlled together and automatic control can be fitted if desired. The precise design and careful construction of the radiating surfaces ensure an even distribution of infra-red rays on the work under treatment.

Infra-red units of the type have proved highly successful in the drying of paints. The large number of different types of paints and synthetic finishes makes paint-drying a highly technical subject, which can only be dealt with by the paint specialist, but there are three main types of coating which require heat. The first is paint in which a solvent is evaporated, leaving an oleo-resin and a pigment; the oleo-resin must then be oxidized to form a hard paint film. This oxidation is very slow at a temperature of 100–180°F., but it may be speeded up appreciably as the temperature increases. The drying process, however, still remains comparatively slow at temperatures below that at which burning of the resin and spoiling takes place. For example, one paint of this type dried at 200°F. in 2 hours, at 300°F. in 10 minutes, and spoiled in 2 minutes at 350°F. before it dried.

The second consists of lacquers in which a solvent is evaporated and no other change takes place. An increase in temperature and in air circulation assists in the removal of the solvent, and this type of paint rarely offers serious problems for speedy drying. Thirdly we have heat transformable paints, in which not only is a solvent evaporated, but there is also polymerization of the vehicle. This polymerization is a physico-chemical change in which simple molecules combine together to form complex molecules of the same chemical composition. The process is generally very slow at temperatures of 100–150°F., but above a critical temperature becomes very fast indeed. This temperature is less than that at which burning and spoiling of the paint occurs in a reasonable time. For example, one paint of this type required 1 hour to dry at 180°F., and only 1 minute at 230°F. The gloss of the surface, however, was lost after 5 minutes at 230°F., but this 4-minute interval is a practical operating margin.

These three main types decide the most practical drying temperature and drying time at that temperature, but generally speaking it is possible to think in terms of a minute or less for lacquers and heat transformable paints, and 10 to 20 times as long for oleo-resin types. The drying temperature referred to is the actual paint temperature.

The success of infra-red drying has been due in part to the development of the polymerizing finishes, and though infra-red can greatly reduce the time required for drying other types of paint, the results are likely to be less spectacular, though still of considerable importance.

Infra-red is applicable to many processes other than paint drying, for example: Moisture removal from paper pulp articles; drying of resin impregnated armatures, condensers, transformers, &c.; softening of plastic strip prior to punching; annealing of glass bulbs; drying synthetic resin powders; perspex moulding; and drying ceramic materials before firing.

From Searchlight to Kitchen

Somewhere in the North-West area of the Gas Light and Coke Company's district there is an A.T.S. unit attached to a searchlight station. Since joining up several of the girls have become engaged, and some of them now have husbands in the Forces. All of them are eager to know how to cook, and the Gas Light and Coke Company has come to their aid with a series of lectures, demonstrations, and practical lessons at one of its nearby showrooms. 'Accommodation is limited to 12, and the prior claims of duty make it impracticable for the same 12 girls to attend on every occasion, but there are always more than enough to fill up any vacancies.

We looked in on one of the "practical" afternoons a few days ago and saw a dozen prospective housewives thoroughly enjoying their work under the supervision of Miss K. Boswell, one of the Company's Home Service Advisers. Six of them were making queen cakes, and six were making baked sponge puddings, all from the same recipe, but by different treatment. All 12 of them were also doing a tempting cheese savoury. The broad idea of the course of 12 sessions is to give the girls foundation recipes to work out for themselves, and to enable them to acquire sound common sense on the kitchen front. Their attendance is quite voluntary, and in their off-duty time.

It was a coincidence that just when the Company was proposing to the heads of all the women's services that some such lessons should be offered, the officer in charge of this particular unit took the first definite step by asking for local facilities. As an experiment the course is proving a great success, and it is anticipated that similar courses will be arranged in other areas.

French Gas Association

The close and friendly relations that have always existed between the Institution of Gas Engineers and the Union Syndicale de l'Industrie du Gaz en France, inevitably interrupted by the enemy occupation of France in 1940, have now been actively resumed. Cordial letters have been exchanged by the Presidents and Secretaries of the two national bodies, and it is hoped that it will be possible before long for personal contacts to be renewed.

Considerable damage has unfortunately been suffered by gas-works and distribution systems in France, but we are happy to learn that the Paris headquarters and library of the Union Syndicale have come through unscathed.

The President of the Union Syndicale is Monsieur L. Watel-Dehaynin while the Secretary is, as previously, Monsieur Pierre Mougin, who will be remembered by many gas engineers in this country in connexion with his work as the first Secretary of the International Gas Union.

Members of The Institution of Gas Engineers are invited to attend a General Meeting of the Institute of Welding to be held at the Institution of Civil Engineers, Great George Street, Westminster, S.W. 1, on Jan. 31 at 6 p.m., when a discussion on "Welding in Higher Technical Education" will be opened by Professor H. Wright Baker and H. Martin. Tickets of admission and summaries of the speeches to be made by the openers may be obtained on application to the Secretary of the Institute of Welding, 2, Buckingham Palace Gardens, Buckingham Palace Road, S.W. 1.

At a Home Guard stand-down social at the Gas Showrooms of the Greenock Corporation, Councillor Brotherstone, Chairman of the Gas Committee, expressed appreciation of the valuable work done by the Gas and Electricity Platoon of the Home Guard. Major Anderson, Captain Watson, and Lieut. Keillor were also present, and the Major presented members of the platoon with the King's Certificate.

Correction.—Our photograph on p. 49 of the "JOURNAL" of Jan. 10 was taken during a visit of the Manchester and District Junior Gas Association to St. Helens, and not of the Manchester Senior Association as stated in our caption.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Repairing Refractories in Vertical Retorts*

By J. N. SHORROCK, M.Sc.(Tech.), Birmingham Gas Department

IN view of the large number of works which, after five years of war, appear to have a good deal of major or minor refractory repair to carry out, it is thought that some interim notes on (1) a patching cement, (2) a method of spraying, both of which have been found useful, may be of interest. The work on both is by no means completed.

Throughout, to save words, I shall use the word "brick" as being synonymous with "refractory shape," and "cement" as synonymous with "refractory cement," "fireclay jointing," &c.

Characteristics of a Good Cement

The lasting satisfaction to be obtained from a cold repair depends largely upon the choice of a cement. For example, a cement which would be perfectly satisfactory for the top firebrick courses might be hopeless in the bottom of the bottom firebrick, where a cement is required which will become really hard without the application of much heat. The introduction of an ideal silica cement which would so joint-up a setting as to make the joints indistinguishable in properties from the retort material would result in a tremendous saving of therms and manpower.

It has been suggested that the very weakness of cements is an asset in that an outlet is provided whereby the unbalanced stresses of the brickwork can be relieved. This argument has considerable weight, but my opinion is that, on balance, this gain is more than offset by the harm that comes through poor joints opening, the cement falling out, and the subsequent leakage that may grow with surprising rapidity in unfavourable positions. Unfortunately there are so many factors to be considered that the perfect cement has yet to be found.

Some of the desirable factors are:

(1) The cement should be strong and hard at working temperatures. It may require several fluxes of different fusion points to get a cement strong over a considerable range.

(2) The cement should adhere strongly to the brick when applied. This is one of the most desirable, but least controllable, of factors. It is often observable that when two halves of the same block are jointed up the cement will adhere to one and not to the other. This sometimes makes the interpretations of cement trial test-pieces very difficult. The phenomenon of adhesion is a complex one, involving the roughness of the surfaces, their porosity, the interplay of molecular forces of surface tension, &c., as well as the size, shape, and nature of the cement particles. At high temperatures chemical interaction involving fritting and fusion takes place. To date, little purely scientific control of many of these factors has been successfully introduced, but with the ever-increasing knowledge being obtained by such methods as X-ray investigation of the lattice structure of clays, advances should not long be delayed. In the meantime, every effort should be made to ensure that the cement is given every chance to adhere. Too often, for example, we see bricks stored for long periods under very dirty conditions; they thereby acquire a coat of greasy dust. Tests on such bricks compared with clean ones have shown us that adhesion of even the best cement is much interfered with and, in some cases, inhibited.

(3) The drying shrinkage should be as small as is practicable to avoid severance from the brickwork pending heating up.

(4) The cement should be easy to work, otherwise even good bricklayers under good supervision will not be sufficient to ensure a satisfactory job.

We went to the trouble of having three walls, approximately 4 ft. by 3 ft. by 4½ in., built with three different cements by the same bricklayer, who was encouraged to do his best in each case. The degree by which the wall built with the "fattest" cement surpassed the "leanest" was very illuminating.

(5) The cement should have a fairly high fusion point to give a good margin of safety.

(6) The cement should have a close texture to minimize fluxing attack and leakage.

(7) Its reversible and irreversible thermal expansions should be small, or keep in step with the brick as far as possible, and its elasticity should be high to enable it to conform with unavoidable movement during periods of temperature change. We have little data on elasticity, but some unpublished data of the late R. E. Jefferson on thermal expansion show that many silica cements do not conform with this requirement.

(8) It should air-set reasonably hard so as not to fall out during heating up.

(9) It should be free from any tendency to spall, flake, or shatter under temperature fluctuations.

It is unlikely we shall ever have a cement which would have all these qualities in a high degree. For fireclay work the requirements are not incompatible, and several proprietary cements are entirely satisfactory if used with intelligent consideration of their properties.

* From a Paper to the Midland Junior Gas Association.

Experimental Silica Cement

The case is different for silica, and we have carried out some work to try and develop a good silica patching cement. Constituents were chosen with the object of obtaining a product which should conform, as far as possible, with the foregoing points.

Silica grog—*e.g.*, crushed silica brick—was chosen as the backbone of the cement, as nothing would conform better to the thermal movements of the brickwork. It had been found in previous work that phosphoric acid had good qualities as a bonding agent. This material is a solution of orthophosphoric acid, H_3PO_4, in water, and the commercial variety which is suitable has a specific gravity of 1.5, and contains 66% phosphoric acid. Obviously this material, though not as dangerous as the stronger acids, must be used with reasonable caution and intelligence. Its jointing properties appear to be due to the formation of a compound with silica. This is known as silicyl phosphate—the generic formula for which is $xSiO_2yP_2O_5$. Though this compound is probably indefinite in character, we have found it possible to prepare a material approximating to the composition represented by the simple formula $SiO_2P_2O_5$, which fused about 1,200°C., forming a clear melt at 1,250°C. A higher proportion of silica gave a higher melting-point, one product giving a cone which did not bend over at Seger Cone 29 (1,650°C).

To facilitate combination with the phosphoric acid, a proportion of fine raw silica flour suggested itself. Suitable samples of this also gave a slight final expansion to the cement, which helped to hold it in place in the joint. The finely graded silica flour effectively filled the interstices between the silica grog grains.

A small amount of ball clay provided the necessary plasticity and good working properties, and the alumina content provided part of the high temperature flux.

A cement of this general composition was arrived at :

Fine silica flour (90% through 200 IMM)	5 parts
Ground silica brick (through 20 IMM)	4 ,,
Ball clay	1 part
Phosphoric acid (1.5 sp.gr.)	½ gallon to 100 lb. of dry mixture.

The phosphoric acid was diluted with at least an equal volume of water, more water being added as required as the mixing proceeded. To our more recent mixes 1% of bentonite was added, as this appeared to toughen the cement. Bentonite is chiefly montmorillonite, $Al_2O_34SiO_2H_2O$, a very plastic clay resulting from the weathering of pumice.

Quantities of the order of 200 lb. of dry material were found to be very conveniently mixed in a Winget concrete mixer. In any case, complete mixing, both dry and wet, is essential.

Precautions

There is one important point which must be emphasized strongly, and which applies equally to making up the spray referred to later. Very fine silica dust which will easily pass through a 200 mesh sieve, in particular that where the size of particle is below $\frac{1}{20000}$th of an inch, is very dangerous to inhale. It is a cell poison, and having once entered the lungs is never expelled, and may finally give rise to silicosis, resulting in ill-health or even death. It is therefore important to avoid even spasmodic inhalations, as "dust floods" are even more dangerous than continuous breathing of less concentrated quantities. When dealing with silica dust there is a legal obligation* to take special precautions, and it is essential to have effective dust extraction arrangements. For the making up of occasional small experimental batches we find the simplest plan is to insist absolutely upon the men wearing dust respirators while mixing the dry silica powder. (A Mark 4 dust respirator has been developed by the Chemical Defence Research Department and is suitable for this purpose.)

Cement

One satisfactory cement had a final grading:

On 30 IMM	= 5.0%
30–60	= 18.5%
60–90	= 9.5%
90–200	= 14.0%
Through 200	= 53.0%

The cement was very popular with the bricklayers, as it worked well. It was fairly strong after air-drying, although this was rather slow. The strength at 1,100° was good, and at 1,410° excellent. The adherence was the outstanding feature of this cement. Patches put on to silica were heated, cooled, and re-heated without breaking away, and it was usual for any fractures to take place through the bricks or cement and not at the junction of the two. It has been tested for resistance to fluxes and for its own fluxing propensities, with satis-

* See *Factory Orders*, pp. 223–225, H.M.S.O., 1944.

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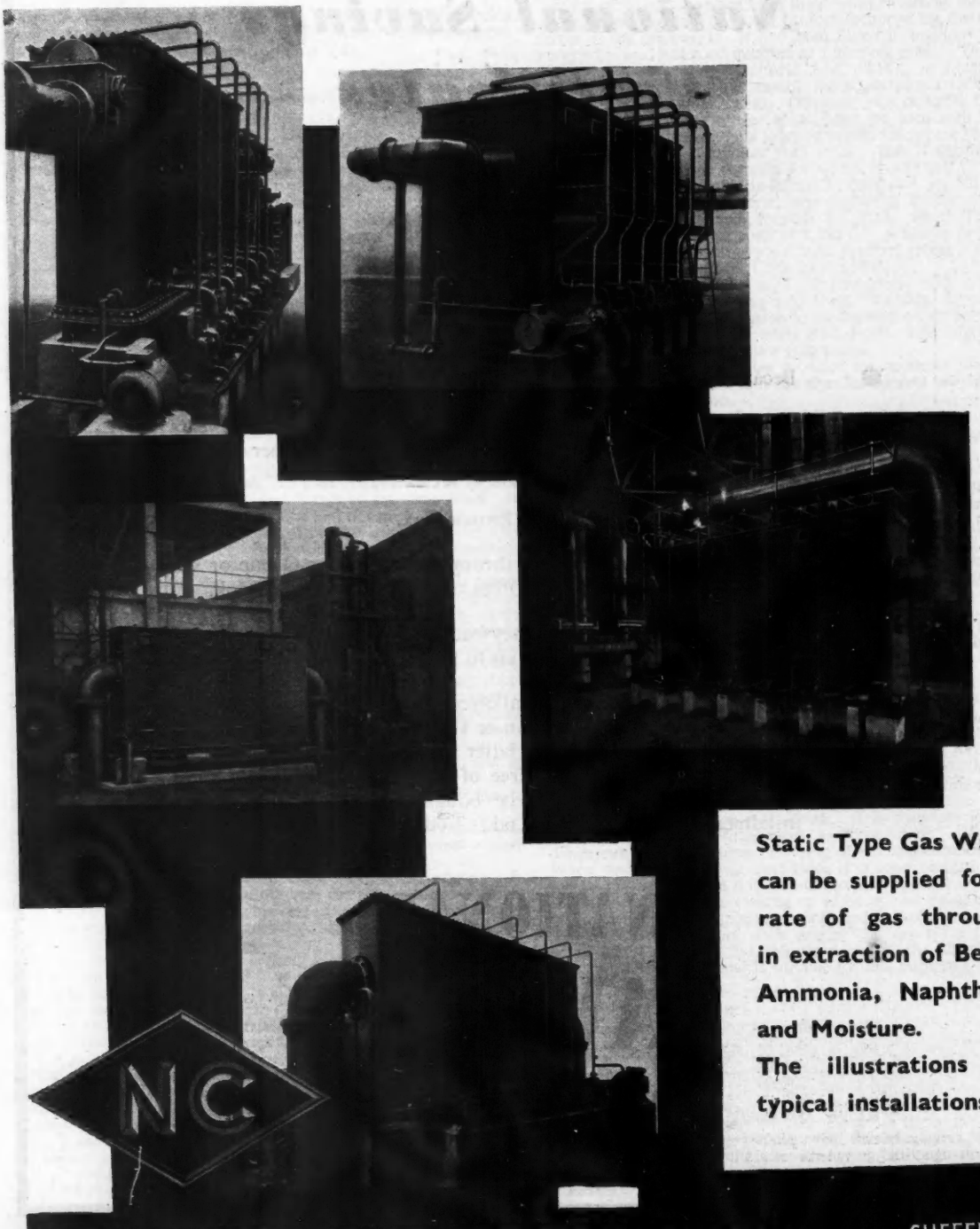

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factory results. The cement has proved satisfactory for cold patching of silica work and for pointing. As a test, some panels were cut back about 1½ in., and the edges keyed back at various levels in a cold retort under repair and filled with this cement. After 18 months' working there was an opportunity to examine them again and they were still in very good order. The retort was put to work again, and the patches remained satisfactory for the rest of its working life (3¼ years in all).

We have also had some success in our preliminary experiments with a form of spraying suggested in a Paper given by S. Tweedy before the Northern Section Coke Oven Managers' Association, May 27, 1942, *vide Gas World*, Jan. 2, 1943.

Wet spraying cannot be considered theoretically sound, as the cooling effect of evaporating off the water must rack the refractory. The frothing effect in drying weakens the new material, while the steam generated tends to drive off the patch. Moreover, as normally done it is extremely wasteful, and often less than 10% is firmly attached.

The suggested method, which may be described as a semi-dry or frit method, has definite advantages on these points. The spray is so fine that most of the water is evaporated off before reaching the refractory, and the new material is a frit which does not show the weak frothing formation of the older method, while a large percentage is firmly adherent. This method can be considered as supplementary to the welding process, as its speciality is repairing or building up of considerable areas. The speed of application is considerable, it is comparatively cheap, and less skill is needed than for welding repairs to give a satisfactory job, but it is not claimed to be superior to a good welded repair in adhesion, strength, or hardness.

Before any other tests were done it was verified that the considerable volume of air from the pressure jet was not detrimental to the refractories. So long as the temperature of the silica was high enough (normally about 1,100°C.), it was found by experiment that a powerful jet did not affect it, and, as might be expected, firebrick was even more resistant.

Slurry Composition for Firebrick

We had previously done a considerable amount of work on spraying material, and were able to use some of the knowledge gained. Borax, for example, had been found a useful flux where its rather low fusion point could be accommodated. Phosphoric acid made a bond at a somewhat higher temperature. The use of the phosphoric acid suggested the presence of finely divided raw silica flour. A fair percentage of grog, including some fairly coarse material, is desirable, especially in the firebrick spray, to avoid undue contraction. This demanded that there should be no fine passages or jets in the design of the spray.

For building up top firebrick where a very high temperature was not reached, a material having a fairly high flux content was indicated. After a number of trials considerable success for this particular job was obtained by using a spray having the approximate composition: 45% fireclay; 25% firebrick grog (through 20 mesh); 25% fine silica flour; 4% borax; and 1% of bentonite, plus water about a third of the total weight. To this was added 3½%, by weight, of phosphoric acid, usually just before spraying, to minimize corrosion of galvanized buckets, &c. The bentonite assists in keeping the spray from settling and in conditioning the patch.

This material was tried out on a fairly large scale on our Coal Test Works, where top firebrick averaging at least 18 in. by 9 in. by 3 in. to 4 in. had been eroded. It was found possible to build up this very considerable area, and the material remained adherent after the retorts had been let down cold for repair. The patch had survived four scurfing periods.

A similar but smaller area was done as a demonstration at Windsor Street in June, 1943, with good success, and is still giving satisfactory service.

Silica Trials

We have carried out a number of tests to find a material suitable for spraying on to silica. In positions unlikely to be subjected to much over 1,100°C. we found a slurry made from 6 parts silica grog (through 20 mesh), 6 parts fine silica flour, 1 part commercial borax dissolved in 4 parts hot water, 1½% bentonite, and 1½% phosphoric acid (density 1.5) plus water gave a hard and well adherent product with a fusibility about Cone 15 (1,430°C.).

We have not yet found the ideal high temperature product for which we are aiming, but among our more successful trials we have found that a mixture of a proprietary spraying cement with half its weight of Cornish stone (a siliceous felspar) and 2% of bentonite was very adherent and fairly strong with a fusion above Cone 26 (1,580°C.). One mixture contained a few per cent. of magnesia, gave a material which adhered excellently and built up very well, but was soft.

It is suggested that such a material might be very useful for filling up a considerable hole, and if the welding gun were used on the surface of the patch this might be fused to an entirely satisfactory hardness. So far we have not been able to try this suggestion out.

It is remarkable what wide differences result from quite small additions of various materials, both in the way the spray builds up and in the final product. Mica, for example, gives very good building-up of rather voluminous material, but the use of this and other potent fluxes requires considerable discretion.

The Sprayer

Our experimental apparatus consists of a 10 in. length of 8 in. diameter steel main with a $\frac{5}{16}$ in. steel plate bottom welded on, and a cover having a pressure-tight joint which can be broken and re-made easily and quickly. The slurry is sieved through a 5 IMM sieve into this container, its viscosity having, by addition of water, been made such that it will flow slowly through this sieve without help. The lid is put on and made tight. Compressed air forces the slurry up a central pipe to a tee where a jet of air at about 80 lb. pressure meets it. The size of the jet, about 70/1,000ths in our apparatus, is of utmost importance to the smooth working of the appliance. Too large a jet gives undue back-pressure and leads to a fluctuating delivery. The spray travels along a hose and a rod to the nozzle. We have found liquor or water sprays on the end of a length of ¼ in. or ⅛ in. gas pipe to be a satisfactory tools for experimental or short range jobs. The final aperture is $\frac{3}{16}$ in., and grog up to $\frac{1}{16}$ in. can be used. The apparatus is fitted with two pressure gauges and a pressure release valve. For long range work we have fitted up a 14 ft. ¼ in. gas pipe running inside a ½ in. stainless steel tube to give rigidity. Various improvements have been suggested, and some incorporated on later models—such as an easy filling device, automatic stirring, and a self-contained air compressor.

Advantages

The following advantages can be claimed to date:

(1) The atomizing effect enables large thicknesses to be applied almost as though fritted on, and without excessive porosity.

(2) Comparatively coarse mixtures, including grog up to $\frac{1}{16}$ in., can be sprayed.

(3) The method is comparatively quick and handy, and not prone to breakdown once the technique is acquired.

(4) The air blast before the slurry is admitted removes loose dust, &c., from the surface to be built up.

(5) The method is economical, as a high percentage of the material stays firmly in position.

(6) The slurry can be varied to meet the needs of the job in hand.

(7) The apparatus is easy to fit up and cheap to work.

Retort House Operation and Control*

By C. A. DEAS,

Tottenham and District Gas Company

(*Report of Discussion concluded from p. 83*)

Mr. L. Muir Wilson (South Metropolitan), in seconding the vote of thanks, agreed with the Author as to the need of improvement in working conditions. One reform which he hoped would be introduced into the Industry before long was a 48-hour week for process workers, with no loss of earnings and no overtime. Gas, however, must be made steadily throughout the seven days of the week if they were to make reliable products and carry the capital cost of the new labour-saving machines they needed. This could all be arranged as was now done in competitive industry, where it had been found economic to limit working hours. One of the great advantages of scrubber stand pipes was that any retort could be readily opened up at any time without affecting others. This make scurfing by aeration a regular routine job, to the almost total elimination of scurf, and a steady pressure, free from pulsation, could be maintained in the retorts at all times. These factors had much to do with the prevention of holes in retorts, and another of their strong points was that they put tar into the tar tanks, which otherwise messed up the doors and mouthpieces. They had always tried to run tar uphill into their ascension pipes, with the result that they got refluxing and stoppage from the descending semi-carbonized mass. After their experience with scrubber standpipes they knew of nothing better in every way; they made things much better for the men and the work was lighter and cooler. All that Mr. Deas had said about recirculation was correct. With regard to fuel consumption, they had a pair of 10 setting sections at their Rotherhithe Works, each with its own waste heat boiler. They were similar in every respect, save that one re-circulated. They had another pair of sections each of 15 settings at East Greenwich, which were similar to one another as the Rotherhithe sections. They hoped to be able to use their waste heat boilers as calorimeters for the purpose of comparing the fuel consumption. The work involved many more complications than they expected, but they overcame them fairly well. Each pair of sections was worked under exactly the same conditions as regards time and weight of charge, but naturally the recirculation settings were measurably cooler. Sometimes it seemed that one type of section was slightly more economical in fuel; at other times the results would appear reveresed. All they could say now, after a year of experience and very careful investigation, was that there was nothing to choose between recirculation settings and standard settings on the ground of fuel economy. With regard to waste heat recovery, he was still rather at a loss to know what to do with all the waste heat produced by a station equipped entirely with horizontal retorts. They needed some device better than re-

* Paper to the London and Southern District Junior Gas Association. Published in "JOURNAL" of Jan. 10.

FIRST OCCASIONS...

from "Editorial Notes," GAS JOURNAL, Jan. 17th, 1940

". . . On July 2, 1930, we published an abstract of a Radiation patent relating to a cobble type of inset fire heated by luminous flames. To the best of our knowledge this was the first occasion on which a brightly incandescent fire of the modern inset type was produced in which the gas was burned in the form of luminous flames, and thus silently . . .

. . . In June, 1937, it became evident that Radiation Limited would before long have available other types of gas fire which would not use the columnar type of radiant that had characterized gas fires since about 1907 . . .

. . . It is to us most stimulating, as we believe it will prove to others concerned with utilization of town gas, to know that the workers in the Radiation research laboratories, . . . should have had the courage to persevere and overcome the difficulties encountered. The results of this breaking of new ground will, we are sure, receive the full recognition and appreciation they deserve from the Gas Industry . . ."

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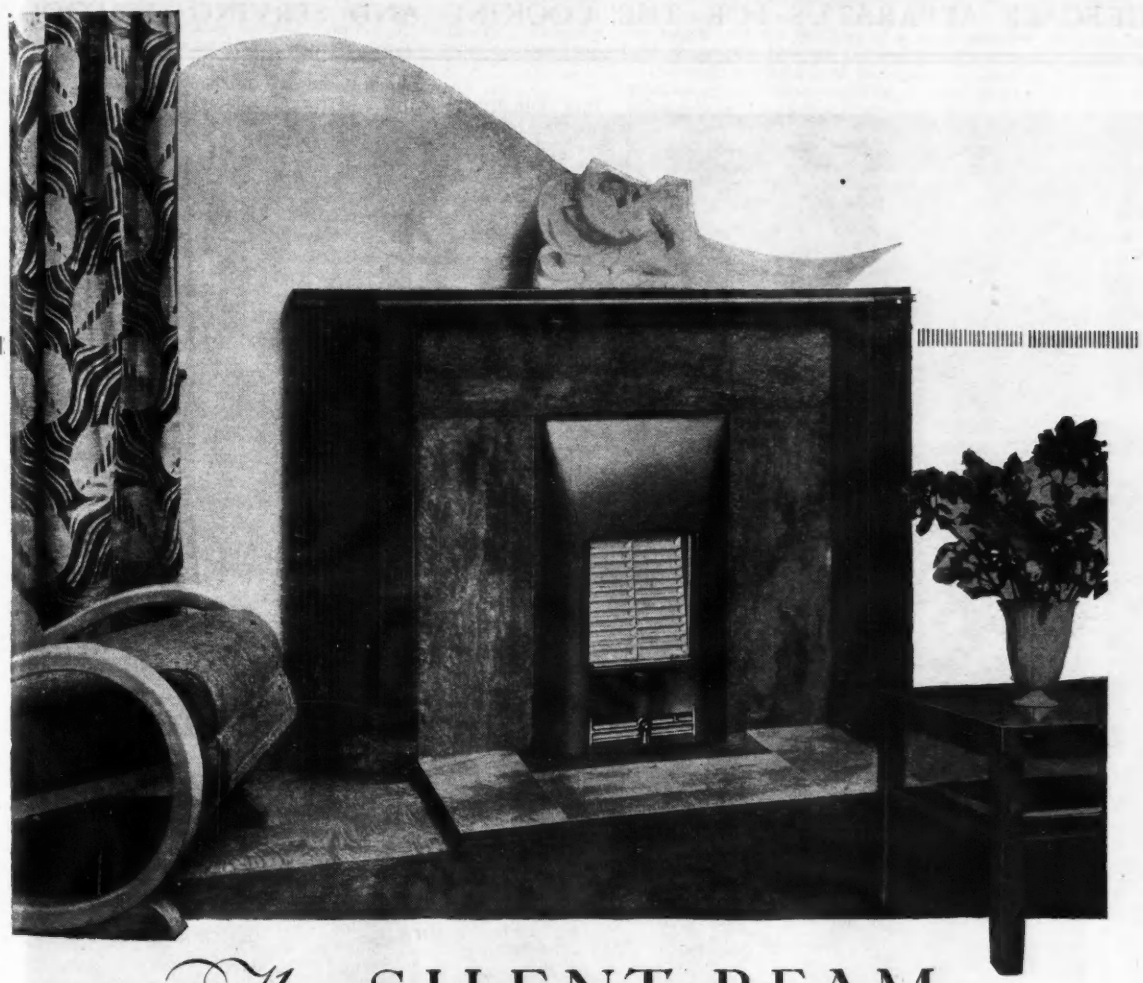

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cuperators for returning the heat to the carbonizing process. Brickwork would not be porous if it was always—and not only sometimes—kept under pressure. Gas would usually not leak outwards if pressure was always maintained, whereas air or waste gas would very soon find their way in because they burnt carbon out of the cracks. Pumping air into a retort was no sort of test, because it was not air that they were trying to keep in.

Mr. **Deas** briefly replied to the vote of thanks.

Mr. **C. T. Price** (Hampton Court), in a written contribution, said one noted from the Paper that Mr. Deas had no coke yard, and that all coke produced was cut, graded, and stored as made, and this contributed to his efficient coke and breeze production figures. He agreed with him in keeping the retort house clean and tidy, well ventilated and lighted. If one was careful to lay the charge off the front cross walls at either end, the spillage of tar and pitch could be avoided.

With regard to dust extraction he had recently given consideration to this, but had come to the conclusion that the troubles were due to blackout conditions imposing the use of a fairly tight jack roof. Most of the dust and fliers hit the roof and fell back on to the beds and superstructure. Very shortly they would be able to do away with jack roofs altogether. Their latest idea was to pipe both horizontal and vertical retort houses on both sides and connect a portable vacuum cleaning apparatus for hot dust removal, using flexible hose and other equipment. As a matter of interest the cost of the installation for a two-million house would be only about £500. At the present time, as in the past, they secured the removal of fliers accumulation on a piecework basis. He was glad to see that Mr. Deas again stressed the importance of full charges. With the use of the "M" head on the Gibbons machine they had been able to increase the capacity of their horizontal retort house by 30% merely by increasing the weight of charge to 15½ cwt. per 20 ft. retort (23 in. × 16 in.). Obviously considerable all round economy was obtained by concentrating gas-making on a minimum number of beds. Equally important was the disposal of the multitude of evils which were present with light charges.

With regard to the so-called "elaborate governors," Mr. Deas would remember that in 1943 he (Mr. Price) queried the wisdom of the re-use of the old type bell governors in his own remodelled house. He had as yet been unable to find anyone who would say definitely that the new governors were superior from the point of view of thermal production. It was admitted that they gave more accurate control and were quicker to respond to change of conditions; he had, however, decided to make the change-over shortly without guarantees, as he was anxious to squeeze the last useful therm out of the system, and he considered the expenditure was so small as to be worth a trial. He noted that the blue brick lining of the flume conveyor was carried up only 6 in. from the bottom of the trough, and suggested that it would pay to line the whole of the trough sides with blue brick, and thus do away with any possibility of erosion between blue brick and concrete. With regard to the screening of breeze, he had spent two years on the problem, using a converted coke-cutting plant, and had recently abandoned it as not worth while. They did not obtain sufficient revenue for the small nut coke, and the fines were unmarketable, and they had come to the conclusion that rough breeze as they knew it was best left "as made" both for use on works boilers and as a saleable commodity. He was sure it would be a retrograde step to add the quarter-inch material to dust to the coal charge, even in small quantities. Their own desire was to keep the coke as free from ash as possible,

Mr. **Deas,** in reply to Mr. Price, agreed with him that the necessity, owing to blackout conditions, of having a fairly tight jack roof did cause dust and fliers to drop back into the house which were previously discharged into the atmosphere. Mr. Price suggested that the ending of the blackout, enabling the jack roof to be dispensed with, would solve the problem. Mr. Deas wondered, however, what the local residents would think of this idea, and he still thought that the ideal way was to have a suitable extraction plant by which the fumes, dust, &c., could be dealt with under controlled conditions.

With regard to the blue brick lining of the flume conveyor, Mr. Deas agreed that there was a possibility of erosion between the blue brick and the concrete. Whether this was serious enough to justify the extra expense of lining the whole of the inside of the trough, time alone would show.

Mr. **R. T. de Gruchy** (Gas Light & Coke) wrote: Among a host of debatable points in Mr. Deas' Paper I will comment on only one—namely, the question of breeze treatment. In breeze as ordinarily produced, the presence of dust, say below ¼ in., reduced the fuel value of the remainder by a disproportionate amount; that is to say, if there is 40% of dust the intrinsic fuel value of the remaining 60% is probably greater than the whole of the mixed product. I can only suppose that the reason for not making better use of breeze lies in the difficulty of disposing of the dust fraction.

The satisfactory disposal of breeze on the works is more likely to be an acute question where carbonizing is done in continuous vertical retorts, which tend to produce both a higher proportion of breeze and a greater amount of waste heat steam. Hence there is less fuel required for direct fired boilers, and more breeze to use. It so happens that coke made in this type of plant is readily combustible in domestic appliances, and this reduces the necessity for close grading of the coke to give satisfactory performance. Does it not seem, then, that in the conditions described, a considerable proportion of the so-called breeze could be incorporated in the boiler nut grade, with consequent betterment of both price and thermal value in use? Admittedly there are difficulties in the way of such a policy. In the first place there may be trouble with the blinding of screens used for this small grade, but with reasonably dry coke this should not be a serious matter.

The main problem is to find a use for the dust fraction. Its most satisfactory utilization would be as boiler fuel in the works, this being dependent in installing a chain-grate stoker which would handle fuel of such small size. Alternatively, it could be blended with coal for carbonization, though this system would be applicable only in rather special conditions. A third possibility for disposal of fine breeze is its use as an aggregate for building block, foundations, &c. In view of the heavy building programme after the war there should be a continuous demand for building materials of all kinds.

The Juniors' Discussion

Mr. **F. H. Cope** (South Metropolitan), in a written contribution read by the President (Mr. R. F. Twist) at the Juniors' meeting, said that on the question of lighting and ventilation he would go further than the Author, and say that the whole architecture and design of horizontal houses needed drastic modification. Retort houses should be much taller, allowing greater space between the tops of the benches and the roof. Coal storage bins should not be carried higher than stage level, thus avoiding tall walls hemming in the operators from ventilation. Ventilation in the roof was useless unless equivalent access was provided at a lower level for fresh air. As to the coke hopper fire, he asked whether the defective spiral chute had been rebuilt and put into use. Re-circulation seemed to him to be a dark horse, but there seemed a consensus of opinion that the throughput of coal in a given setting could be increased without raising the combustion chamber temperature. But if more coal was to be carbonized to the same end-point, in the same time, and in the same (not merely similar) setting, more heat must pass through the retort walls, and if more heat passed through the retort walls in a given time, that could only happen if the mean temperature gradient across the wall was greater. Granted that a rise in temperature of the waste gases at the exit of the setting did not occur, the outer skin temperature of the retort walls must be higher under re-circulation than without in order to do what was claimed. How could a lower, or equal, combustion chamber temperature be correlated with higher temperatures on the outer skin of the retorts? This led to the conclusion that, except for daily comparison and empiric control, combustion chamber temperatures mean just nothing at all. The area sighted by the optical pyrometer was comparatively small, was very near to the heating flames, and comparatively remote from the coal. The materials used in the combustion chamber arches seemed at least as well able to take 1,400°C. as did fireclay retorts to take 1,250°C.

Mr. **Deas** agreed that lighting and ventilation must be improved and retort houses redesigned. So long as there was protection for the charging machines and operators there was no need for massive walls, but it was difficult to persuade people to get away from the habit of putting new plant into old retort houses. The spiral chute had not yet been replaced. For 2½ years before the trouble began the chute was in operation, and it was not until it was badly worn that the trouble really started. Regarding re-circulation, he had yet to satisfy himself how much there was in it. It did not seem to have increased throughput to the extent that might have been expected. In taking combustion chamber temperatures it was necessary in addition to make visual examination of the charges as they came out and to look at the retorts after they were out. Such inspections would tell them more than they could hope to read on a pyrometer.

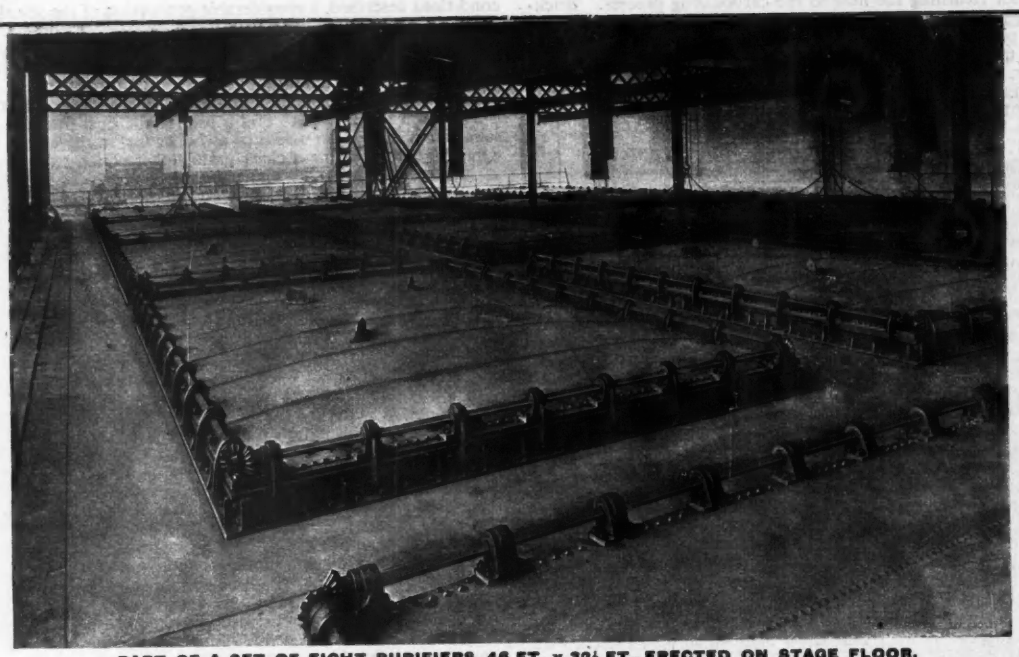
Mr. **D. Brown** (Brighton) said the retort house at Brighton was built some 75 years ago by the father of the present Chairman, and was so well designed that they were in the fortunate position 50 years later of being able to replace the old plant with modern settings, in five tiers, together with producers. He asked if Mr. Deas could give figures as to the make of waste heat steam per ton of fuel, and the waste heat steam percentage of the whole steam requirements of the works.

Mr. **Deas** said their waste heat steam was of the order of 600 lb. per ton of coal carbonized, after providing for the steam requirements of the fan. As regards the steam requirements of the works, this waste heat steam was sufficient for all their steam requirements, but their main source of power was electricity, bought in bulk from the local supply company.

Mr. **W. Wright** (Lea Bridge) asked whether Mr. Deas re-circulated the water used in the conveyor, after filtration, and whether he could tell them anything about pump maintenance.

Mr. **Deas** said the same water plus make-up for evaporation was continually circulated. It passed from the conveyor to the separating tanks, where the breeze settled out, and was there returned to the conveyor *via* the pumps. So far as the pumps were concerned they worked for 2½ years before opening up a pump at all, and then all they had to do was renew minor parts at very small cost.

Mr. **T. S. Ricketts** (Tottenham) agreed with Mr. Deas' remarks on steaming. The continuous vertical retort was the only retort that reduced heat losses by utilizing the sensible heat. He suggested that an experimental static retort might be designed to make use of the heat in the coke and produce a really good thermal figure per ton.



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Mr. **G. W. Warne** (Portsmouth) said he was somewhat puzzled by the figures given for moisture content of coke, particularly the fact that the No. 3 size was the worst.

Mr. **Deas** said it was a big problem to keep the moisture content of the small coke down. Extra water had to be applied to the larger sizes to reduce the dust nuisance, whereas the small coke just lapped up water owing to its very much larger surface area.

Mr. **F. C. Smith** (Gas Light & Coke) asked what system of lighting Mr. Deas used in the retort house, what illumination he provided, and how he coped with the high temperature and the dust.

Mr. **Deas** said the simple answer was electricity. Gas lighting was not suitable for the retort house. The real answer to the problem seemed to be some form of flood lighting. In his own case the change-over had been a wartime measure, and all that was done was to put 150 watt bulbs into old Rochester lamps, with parabolic reflectors.

Mr. **R. Baker** (Gas Light & Coke) remarked that the thermal results recorded in the Paper seemed somewhat lower than they might have been.

Mr. **Deas** replied that it paid to leave some volatile in the coke for the sake of the domestic coke market, apart from the extra cost in fuel of extracting these last one or two gaseous therms.

A vote of thanks was accorded to Mr. Deas on the proposition of Mr. **B. W. Dawkins**, seconded by Mr. **W. Wright.**

Town Gas in the Processing of Glass Tableware*

By J. A. TOMES, Deputy Engineer, Stourbridge Gas Department

GLASS manufacture was introduced to Stourbridge by refugees from Lorraine about 1557, and by 1586 four glass houses existed in the town. Since this time Stourbridge has acquired for itself a well-earned reputation for its cut glass, which is now known throughout the world. The Paper concentrates on the production of tableware; the principles are the same in the manufacture of other types of glassware.

The production of tableware entails briefly the following processes, given in the sequence in which they occur:

(A) Melting of raw materials in pot furnaces.
(B) Furnace pots.
(C) Reheating of the ware for shaping.
(D) Annealing.
(E) Cracking off, and edge fusion.
(F) Re-annealing.
(G) Decorating and polishing (if required by purchaser).

Composition of Glass.—The properties of any glass and the uses to which it may be put vary with its composition and heat treatment. It is impossible to depict glass as a true chemical compound—it may best be described as a mixture of oxides, the principal component being sand (silica). Glass made of soda and silica alone is soluble and is known as water glass, so that lime and other oxides, &c., must be added to make it stable and impart to it other properties. The introduction of lead and potash gives a brilliant glass which is soft and suitable for decorating, while increased soda content, although making the glass easier to work, considerably reduces its durability and brilliance. Thus soda lime (known as "crown" glass) is generally used for common plain ware and lead crystal or "flint" glass for cut glass. Although each firm has its own formula for its ware, typical formulae of mixtures (termed as "batch") are approximately as follows:

Soda Lime.		*Lead Crystal.*	
Sand	1,000 lb.	Sand	1,000 lb.
Dolomite	140 ,,	Red lead	600 ,,
Limespar	62 ,,	Hydr. carbonate of potash	329 ,,
Felspar	48 ,,	Nitrate of potash ...	42 ,,
Barium carbonate ...	28 ,,	Borax	5 ,,
Borax	40 ,,	Arsenic	3 ,,
Soda ash	340 ,,		
Hydr. carbonate of potash	120 ,,		
Soda nitrate	50 ,,		

To the above is added a quantity of cullet or broken glass which has accumulated as a result of broken or bad ware, usually in the ratio of 60% cullet to 40% batch.

The constituent items of the batch plus cullet are carefully weighed, thoroughly mixed, and filled for melting into a refractory crucible known as a glass house pot.

(A) Melting of the Raw Materials

All melting in this district is carried out in "covered pots," each holding from 10 to 15 cwt. of metal, which are contained in varying numbers (usually 5, 8, 10, or 12) in a pot furnace. The glass does not come into contact with the heating gases, which ensures that oxidizing conditions are maintained (which is essential with lead glass) while dust is eliminated, thus enabling higher quality ware to be produced. In addition, each pot may hold different "metal"—an important point where several types of glass are being produced simultaneously in small quantities.

Open-fired furnaces, known as tank and open-pot furnaces, are employed where reducing conditions do not affect the melted glass, and where mass production methods—*e.g.*, manufacture of sheet or bottle glass—prevail.

The batch is shovelled in the pots usually in two or three fillings—the second portion being added after about eight hours, and the third after a further four hours. During the melting of the constituent items of the batch gases are liberated which, together with the occluded air between the batch and cullet particles, must be removed before the glass is said to be "plained." This usually takes some 20–30 hours, depending on the type of glass and the furnace temperature. To accomplish this, "fining agents" (nitrate of soda and potash and arsenic), are introduced into the batch, and evolve large bubbles of gas, which collect the finer bubbles or "seeds" as they rise to the surface of the melt. High temperatures—*e.g.*, *circa* 1,350°C. for lead glasses—reduce the viscosity of the mass and assist "plaining," in addition to rendering the glass more homogeneous. The interval between feeding-in of batch and the time when the metal is plained is known as the "founding" period and consists of two processes—namely, chemical reaction between the batch components, and elimination of seed. To ascertain when the metal is plained it is tested by dipping with a rod through the pot mouth or the blowing of a "proof."

Pot furnaces are designed and built for firing with various fuels by several contractors. A well-known type is the "Fofumi" furnace as built by King, Taudevin, & Gregson, Ltd. Producer gas, which is made in external coal-fired producers, is conveyed to the "eye" of the furnace by a central uptake, around which the pots are arranged on a "siege" in the form of a circle. The gas ignites on meeting secondary air previously preheated in a recuperator, the whole being under natural draught.

In this district, for the permanent firing of pot furnaces town gas is in competition with producer gas (made in internal or external producers built with the furnace) and oil, neither of which it has yet succeeded in replacing. Town gas has been used, however, on several occasions for temporary firing, during which periods useful information has been collected. It is proposed to outline the method of firing two pot furnaces of the type mentioned during the time repairs were carried out to the external producers.

The works concerned have two similar 10-pot furnaces, the producers of which were shut down in turn to allow for relining. Thus conditions prevailed over two periods, with an interval between, when two similar furnaces were working side by side—one fired by producer gas and the other by town gas. The Department was thus afforded the opportunity of estimating the price per therm needed to compete with this alternative method of firing.

Method of Heating Melting Furnaces by Town Gas

This may most conveniently be considered in three main stages:

(*a*) Preliminary work, in which the major decision was the choice of the point of admission of the town gas to give optimum conditions.

An even and uniform temperature is vital for good pot life and good glass. Optimum conditions are obtained when the flame is slow moving, long, and soft, and appears to fill all the combustion space, thus completely enveloping the pots, while the maintenance of a slight pressure inside the furnace causes it to be visible through "sight" holes situated round the furnace sides to a length of about 2 to 3 in. A sharp hard flame must be avoided at all cost, as it would inevitably result in a poor pot life by attacking the rear and base of the pot.

For permanent firing the designers recommended the use of a water-cooled feed pipe with a sillimanite head, inserted in the uptake to the eye, so that the top coincided with the venturi throat just below the secondary air ports. It was decided to adopt the method suggested, but in view of the temporary nature of the job to construct a head for ourselves. This head proved satisfactory, and when removed at the end of each period of firing was found to have suffered no deterioration.

To allow for adjustment of the head a series of tees as incorporated in the 3 in. pipework and the control of the gas flow was affected by the use of an ordinary slow moving 3 in. gas valve. The feed pipe with head was inserted through the cleaning door opening at the bottom of the burner "eye" and a seal plate was fabricated to take the place of the door itself. To observe combustion conditions a mica inspection hole was provided in the seal plate.

(*b*) Actual change-over from producer gas to town gas firing. The procedure was as follows:

1. Producer charged for last time at 2 p.m.; production of gas practically ceased by 2.30 p.m.

2. At 2.30 p.m. opened producer charging hopper to atmosphere, and connected producer gas main direct to chimney pull (by by-pass connexion direct from producer gas main to waste gas flue), thus by-passing furnace itself, the object being to burn out any soot or carbon deposit in producer gas main. Commenced to build seal wall in producer gas main between producer and uptake so as to isolate producer.

* From a Paper to the Midland Junior Gas Association.

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3. During the building of this the cleaning door was opened under the burner eye and the feed pipe and head inserted and secured at the predetermined height. The seal plate was bolted into position, taking care to insure gastight. Gas turned on to furnace (4 p.m.).

4. Producer gas main disconnected from chimney when carbon burned off at 4.30 p.m. Commenced to empty producer ready for repairs.

(c) Establishment of conditions previously outlined.

With the first furnace the feed pipe was adjusted so that the top of the head coincided with the venturi throat just below the secondary air ports, when combustion took place on the top of the head—*i.e.*, it acted as a burner. It was considered, however, that this flame was too hard and not sufficiently slow moving, and although good results were obtained, it was thought after two days that even better conditions would result if the feedpipe was lowered. It was accordingly dropped a tee—a distance of approximately 12 in.—when combustion took place as the gas met the incoming secondary air and burnt off the head—*i.e.*, the head no longer acted as a burner, but as an open-ended pipe. Conditions were now excellent and the works expressed themselves entirely satisfied with the conditions, which were maintained during this period and also throughout the later period, when the same procedure was adopted.

In view of these results it is considered that for future firing with town gas a feed pipe and head of this nature is unnecessary, and an open-ended pipe placed somewhere in the producer gas main—as far away from the point of combustion as desired so long as the main is gastight—would be quite satisfactory, although for permanent firing it is considered that to obtain the best results it would be advisable if possible to recalibrate the size of the main to suit the higher quality gas in view of the effect of the reduced quantity on the velocity.

Since this time town gas has been used in the furnaces on several occasions in varying quantities up to 2,300 cu.ft. per hour to augment the producer gas made. This was accomplished quite satisfactorily by the insertion of an open-ended pipe through the cleaning door at the bottom of the "eye," and allowing it to project inside some 7 or 8 in. only.

Results

Temperatures were controlled by hand on the slow moving valve by the shift worker employed to attend to the heats. For permanent firing this man would be replaced by automatic control.

Temperatures were recorded from a thermocouple situated in the crown of the furnace and sighted on to the top of a pot. The temperature readings were also taken with a Cambridge optical disappearing filament pyrometer 2 in. above the metal line just after taking a pot stopper down when the metal is plain in order to allow it to cool ready for working.

The period when the first producer was shut down coincided with August Bank Holiday, when no melting took place, all pots being empty. The following figures were obtained when maintaining the furnace at a recorded temperature of 1,200°C.:

Average daily gas consumption = 97,400 cu.ft. or 438.3 therms.
„ hourly „ „ = 4,058 cu.ft. or 18.26 „

During the second period work proceeded as usual, the glassblowers being employed on a five-day, 8-hourly shift (6 a.m.–2 p.m.).

GAS CONSUMPTION.

				Cu.ft. daily.	Therms daily.	Cu.ft. per av. hour.	Therms per av. hour.	Remarks.
5 p.m. Thur.	-5 p.m.	Fri.		135,000	607.50	5,625	25.31	Gas on 4 p.m. Thursday. Temp. fell 100°C. during change over. Back to temp. at 1 a.m.
„ Fri.	„	Sat.		146,000	657.0	6,083	27.37	Fri. 8 p.m. 10 pots filled; 2nd and 3rd filling at 7 a.m. and 11 a.m. Sat.
„ Sat.	„	Sun.		150,300	677.25	6,270	28.21	Glass plain at 8 a.m. Sun. Pots taken down ready for Monday working.
„ Sun.	„	Mon.		148,000	666.0	6,166	27.77	...
„ Mon.	„	Tues.		147,200	662.4	6,133	27.60	1 pot filled 6 p.m., 2 fillings Mon.
„ Tues.	„	Wed.		145,200	653.4	6,050	27.22	2 pots filled 6 p.m., 2 fillings Tues.
„ Wed.	„	Thurs.		141,900	638.6	5,912	26.60	...
„ Thurs.	„	Fri.		146,000	657.0	6,083	27.37	...
„ Fri.	„	Sat.		143,600	646.2	5,983	26.92	Fri. 8 p.m. 7 pots filled. Pot setting 6 a.m. Sat.
„ Sat.	„	Sun.		138,000	621.0	5,750	25.87	Sat. 6 p.m. 2 pots filled.
„ Sun.	-2.30 p.m.	Mon.		125,600 (21½ hrs.)	565.2 (21½ hrs.)	5,842	26.29	Sun. 6 p.m., pot set on Sat. filled.

Average temperature as recorded in crown during the period was 1,380°C. The figure of 28.21 therms obtained on the third day, when one would expect a low figure, was due to the teaser's (producer and heat attendant) neglect in allowing the crown temperature to rise to 1,440°C. This affords a perfect example of the need for automatic control.

WASTE GAS ANALYSES AND CONDITIONS.

	CO_2.	O_2.	Pressure conditions.
Top No. 1 pot	11.0	2.1	...
„ 3 „	8.2	6.0	+0.085
„ 4 „	7.8	5.7	...
„ 6 „	8.7	2.7	...
„ 7 „	11.3	2.5	+0.08
„ 9 „	10.5	0.8	...
Top of recuperator	9.2	4.3	−0.07
Chimney pull (base)			0.3

Average pot temperature when stopper was taken down was 1,325°C.

Previous experience with a furnace having a built-in producer, such as the "Teisen" (oil-fired), has shown that for very short periods of firing with town gas—*e.g.*, when electric power needed to atomize the oil was temporarily off—satisfactory results may be obtained with an open-ended pipe with a tee looking upwards inserted through the glass pocket. There is an obvious disadvantage to this, however, for long periods—namely, that if a pot breaks the glass flows into the pocket, and it may seal off the burner before anything can be done about it.

A better method for permanent firing therefore is to insert an open-ended pipe about 24 in. into the inspection flue to the bottom of the eye on the non-producer side. The flue is some 9 in. by 4½ in., and after insertion of the pipe is sealed with hard-setting fire cement on the outside wall.

Figures have only been obtained from "Teisen" furnaces, over short periods, when pots are empty of glass. An average figure on a 10-pot furnace for this maintained consumption is approximately 5,600 cu.ft. per hour, and on a D section 5-pot furnace, 3,200 cu.ft. per hour, obtained with a temperature inside the pots of 1,410°C.

The efficiency of melting furnaces is only about 12–18%. Heat losses occur chiefly due to:

(*a*) Radiation from the working openings. This can be very high, depending on the method of working.

(*b*) Stack losses.

(*c*) Radiation from the main structure, which in a modern furnace is insulated to its limit. Added insulation, if carried too far, would have a serious effect on the life of the refractories.

In an area where coke oven gas is not available the difficulty of competing against producer gas will be readily understood, when we remember the fact that our own retort settings are heated by coke and not gas, although it is our primary product, so that on large pot furnaces of the existing design town gas charged on the present industrial scale at Stourbridge is still too costly to replace this method of firing. Realizing that an increase in efficiency is equivalent to a corresponding reduction in the price per therm, the Department intends to experiment with the latest advances in furnace technique, including permeable linings.

The glassworks themselves, however, are anxious to melt if possible by town gas, being fully aware of the obvious advantages it has to offer and of the fact that it would relieve them of a great deal of responsibility.

The result of converting all melting furnaces in the area would mean an increased load, extending over 24 hours of day with little or no distribution charges, of some 700 million cu.ft. per annum.

Small Scale Melting

For small scale melting—*e.g.*, experimental or learners' pots—town gas is employed, since on these cost is not the first consideration, and it is chosen for its many advantages—*e.g.*, labour saving, reliability, no handling or storage requirements, constant C.V. and S.G., ease of control, cleanliness, &c.

A small 2-pot glass melting furnace which has given great satisfaction was designed and built by the Department and is installed in the local Art School. The furnace contains two pots, each holding about 2 cwt. of lead metal. It is equipped with recuperators and is under natural draught. The temperature of the furnace is shown by an indicating pyrometer situated in the combustion chamber, and is controlled by hand on a valve in the gas line. The furnace is brought up to the working temperature over a period of seven days, during which time it is regarded as a pot-arch and a similar temperature gradient is obtained. The furnace is at work continuously from September to July, new pots being installed in the furnace in the September. The pots have always been found to last throughout this period without failing, being filled every Friday, the metal being plained and ready for work on Monday morning at 9 a.m.—*i.e.*, one found per week. The students then work the metal out during the remainder of the week.

With a working temperature of 1,200°C. the gas consumption is 450 cu.ft. per hour (2.02 therms); with a founding temperature of 1,270°C. the gas consumption is 500 cu.ft. per hour (2.25 therms).

It is usually held in the glass industry that the use of a small pot is incapable of producing crystal ware of the same quality as a large one, due to the fact that more surface area of pot per unit of glass is exposed during melting, and iron is dissolved from the refractory to a greater extent, the iron having the effect of introducing a greenish-yellow colour into the glass. It is worthy of mention, however, that ware produced from this furnace has been shown in exhibitions of glass at Eton College, National Portrait Gallery, &c., while other pieces of ware were selected by the British Council for exhibition in America.

(*To be continued*)

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Products Prices—Stocks and Shares

The London Market Jan. 22.

There are no changes to report in the prices of Coal Tar Products.

A Government Order came into effect on March 1 controlling the price of Benzole and Coal Spirit and replacing the Control of Coal Tar Naphtha and Xylole Order, 1943.

The Order is known as the Control of Benzole and Coal Spirit Order, 1944 (S.R. & O. 1944, No. 172).*

By this Order the price of Motor Benzole is fixed at 2s. per gallon. The Order also lays down the method of evaluating Crude Benzole.

The Order also calls for periodical returns to the Ministry of Fuel and Power from all producers of Crude and Refined Benzole.

In connexion with the Coal Tar products market, the Government Order designated the Contol of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

Attention is called to a new Government Order, which amends the price of Toluene as from Sept. 1, 1944. The Order is entitled, The Control of Benzole and Coal Spirit (No. 2) Order, 1944 (S. R. & O., No. 988).

The only change in connexion with the prices of Coal Tar Products refers to Naphthalene. A new Government Order, entitled the Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O. 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene. The new Order came into force on Sept. 22, 1944.

* Slightly amended by Control of Benzole and Coal Spirit (No. 2) Order, 1944, which amendments came into force on Oct. 1.

The Provinces Jan. 22.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 2s. to 2s. 2½d., pure, 2s. 9d. (now controlled by S. R. & O. 1944, No. 988, operative from Sept. 1, 1944. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1944, dated Feb. 18, 1944, S. R. & O. 1944, No. 172, operative from March 1, and S. R. & O. 1944, No. 988, part 1, operative from Oct. 1, 1944. Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943. No. 1528), operative from Nov. 15. 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Jan. 20.

Steady throughput is maintained. Refined tar*: Yield to Distillers is 4½d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7½d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 6½d. to 7d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 2d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

Markets opened with a resumption of the previous week's improvement in prices. As the week progressed, however, some irregularity set in, but as there was no heavy selling movement the declines were moderate. British Funds maintained their values, but home rails closed weaker.

The shortage of stock led to some falling off in the volume of business in the Gas market, but with only one exception prices continued firm, with a general tendency to harden, especially among ordinary issues. Features were the rise of 5 in Watford and 4 in British, the latter changing hands up to 130, while Imperial Continental recovered 2 points. The following were the changes during the week:

OFFICIAL LIST.

Barnet Ord.	157—162	+1
Bombay	40/—42/-	+1/-
Brighton Cons.	100—105	+1
British Ord.	127—132	+4
Ditto 5½ p.c. "B" Pref.	110—115	+1
Commercial	67—72	—1
Gas Light 3 p.c. Deb.	88—90	+½
Imperial Continental	113—118	+2
Liverpool Ord.	119—122	+1
South Metropolitan Ord.	92—95	+1
Tottenham	117—122	+1
United Kingdom 4½ p.c. 1st Cum. Pref.	21/6—23/6	+-/6d.
Wandsworth Cons.	120—125	+1
Watford Ord.	120—125	+5

SUPPLEMENTARY LIST

Brighton 5 p.c. Deb.	121—126	+3
Plymouth & Stonehouse 5 p.c. Deb.	120—125	+3

PROVINCIAL EXCHANGE

Weston-super-Mare Ord.	112—114	+1½

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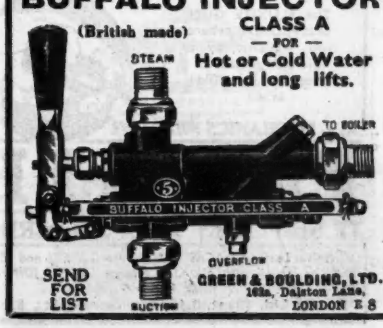

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APPOINTMENTS VACANT

THE LIVERPOOL GAS COMPANY

APPLICATIONS are invited for an ASSISTANT in the INDUSTRIAL GAS DEPARTMENT.

Applicants, who should be under 30 years of age, must have had a good education, with science and/or engineering as the main subject. They should have some drawing-office experience, and be competent to carry out calculations involved in industrial problems. Some district sales experience will be an advantage.

Applicants should be the holders of the Higher Grade Certificate in Gas Supply or its equivalent.

Remuneration will not be less than £400 per annum, and the successful applicant will be eligible (subject to satisfactory medical examination) for entrance to the Officials' Superannuation Fund.

Applications (with *copy* Testimonials) should be addressed to The General Manager and Secretary, Radiant House, Bold Street, Liverpool, 1, and must be received not later than February 10, 1945.

January 11, 1945.

Advertisement issued by permission of the Ministry of Labour.

WANTED.—Competent GASFITTER used to fixing all modern appliances, mains and services and Works Maintenance; able to do plumbing an advantage. 1s. 11½d. per hour; house available.

Apply with full references, Age, &c., to Engineer and Manager, Gas-Works, Skelmersdale, Lancs.

THE DOVER GAS COMPANY

APPLICATIONS are invited for the position of WORKS CHEMIST. Candidates should have experience of the operation of Horizontal Retorts, Carburetted Water Gas and the Recovery of Benzole, also be capable of carrying out the routine tests required with the control of such plant. The Salary will be £300 per annum, plus War Bonus, at present £62 per annum. Applications endorsed "Works Chemist," stating Age, Experience and Qualifications, together with copies of Testimonials, to be sent to the undersigned not later than February 3, 1945.

Gas Offices, Union Road, Dover.

R. G. A. CLARK, Engineer and Manager.

COUNTY BOROUGH OF ST. HELENS

(GAS DEPARTMENT)

APPOINTMENT OF MALE TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at a salary of £285 per annum, rising by annual increments of £15 to £315 per annum (or commencing at an agreed figure up to £315 per annum according to experience).

A cost of living bonus is also payable in accordance with, and subject to, the Scale and Conditions of the Lancashire and Cheshire Provincial Council for the Professional, &c., Services.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937; satisfactory medical examination is essential.

Experience necessary in the operation of Gas-Works Plants, including Vertical Retorts, and in Drawing Office Work.

Give Age, Qualifications and Experience, together with *copies* of three recent Testimonials, and address same to: The Town Clerk, Town Hall, St. Helens, Lancs, endorsed "Gas Technical Assistant," so as to reach him not later than February 5, 1945.

Town Clerk's Office, Town Hall, St. Helens.

W. H. POLLITT, Town Clerk.

SLOUGH GAS AND COKE COMPANY

TECHNICAL ASSISTANT

APPLICATIONS are invited for the above position at a commencing salary of £400 per annum, plus current War Bonus of £62 per annum.

Applicants must possess the Higher Grade Engineering Certificate of The Institution of Gas Engineers, or equivalent qualification.

The successful candidate will be expected to be thoroughly conversant with laboratory practice, and previous experience in the control and maintenance of Continuous Vertical Retorts will be an advantage.

Applications, stating Age, Qualifications, Experience, and particulars of present employment, accompanied by two recent Testimonials, should be received by the undersigned not later than February 10, 1945.

Gas-Works, Uxbridge Road, Slough, Bucks.

J. H. DYDE, Engineer and General Manager.

ROSSENDALE UNION GAS COMPANY

DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited for the position of DISTRIBUTION SUPERINTENDENT with the above Company.

Experience is required in High and Low pressure distribution, with special attention to Industrial and Commercial applications of gas.

Salary to commence at £450 per annum (inclusive of war bonus).

Applications, stating Age, Experience and Technical Qualifications, together with *copies* of two recent Testimonials, to be sent to the undersigned not later than Tuesday, January 30, 1945.

Rossendale Union Gas Company, Gas-Works, Cloughfold, Rossendale, Lancashire.

R. CROWTHER, General Manager and Secretary.

CORPORATION OF GREENOCK GAS DEPARTMENT

WORKS SUPERINTENDENT

APPLICATIONS are invited for the position of WORKS SUPERINTENDENT at the Inchgreen Gas-Works of the Corporation. Candidates must be duly qualified to organize and supervise the repair and maintenance of all gas-works plant and machinery, including steam, electrical and hydraulic installations.

The current manufacturing load is in the neighbourhood of 1,000 million cu.ft. per annum, and candidates should have experience of Continuous Verticals, Carburetted Water Gas Plant, Benzole Recovery and Ammonia Plants.

The Corporation has determined that the Salary attaching to this appointment will be £500, rising to £600 per annum by annual increments of £25.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, endorsed "Gas Works Superintendent," stating Age, Qualifications and Experience, also position in respect of National Service, with *copies* of Testimonials, must reach the undersigned not later than Wednesday, January 31, 1945.

It will suffice if candidates who lodged applications in response to the original advertisement for this appointment will notify the Town Clerk agreeing to the Salary conditions now specified.

Municipal Buildings, Greenock.

A. H. GRAY, Town Clerk.

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(GAS DEPARTMENT)

MAINS AND SERVICE LAYER wanted. Com- mencing wage 1s. 11½d. to 2s. 0½d. according to experienec and ability; 47-hour week. Permanency for suitable man.

Application, stating Age, Experience and position regarding Essential Works Order, to

Gas Offices, Silver Street, Lincoln.

GEO. WRIGHT, M.I.M.E., M.I.G.E., M.I.B.E., M.I.W.E., Engineer and Manager.

Jan. 19, 1945.

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FOR SALE.—A Number of Wrights' "St Andrew" Gas-Water RADIATORS. Also 2.6 Col. Wrights' "St. Vincent" non-water type RADIATORS. Cheap. Address No. 9399, "GAS JOURNAL," 51, High Street, Esher, Surrey.

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(GAS DEPARTMENT)

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TENDERS are invited for the provision and in- stallation of a 300,000 cu.ft. per day CARBURETTED WATER GAS PLANT, with automatic operation, together with electric coke skip-hoist.

Full particulars may be obtained from the Engineer and Manager, Gas-Works, Ashford.

Tenders, in plain sealed envelopes, endorsed "Water Gas Plant," must be received by the undersigned not later than first post on Monday, February 26, 1945.

Council Offices, Church Road, Ashford, Kent.

J. SUDLOW, Clerk to the Council.

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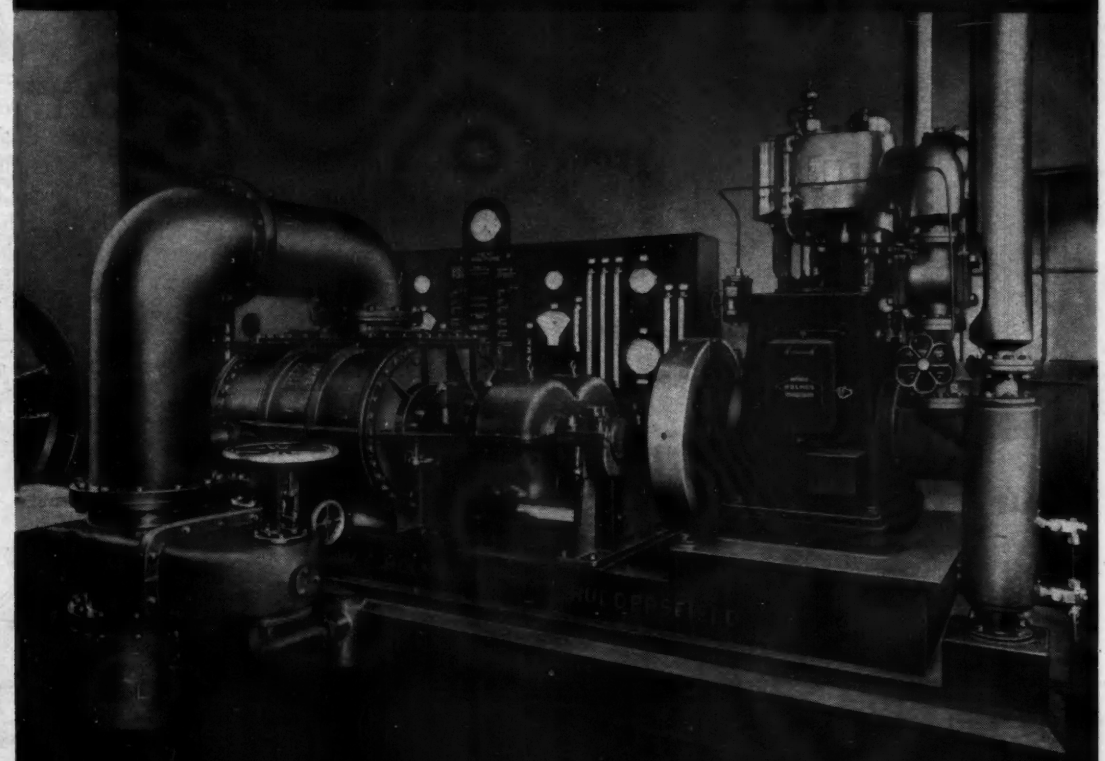

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The illustration shows a Holmes-Connersville Exhauster installed at a Northern Gas Works—capacity 6 million cubic feet of gas per day.

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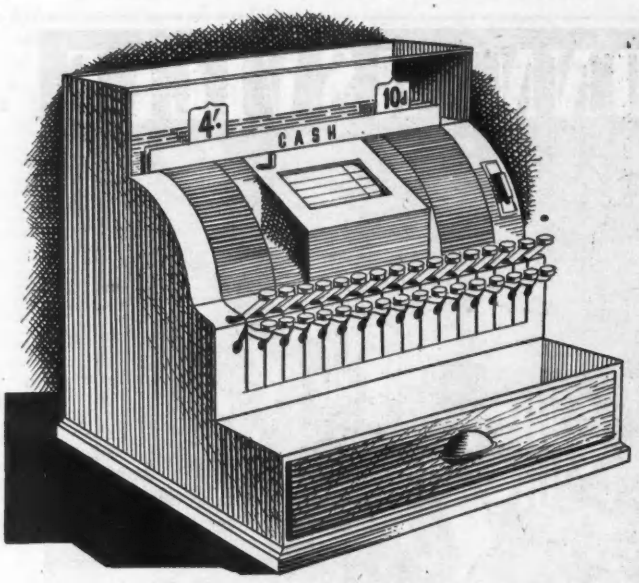

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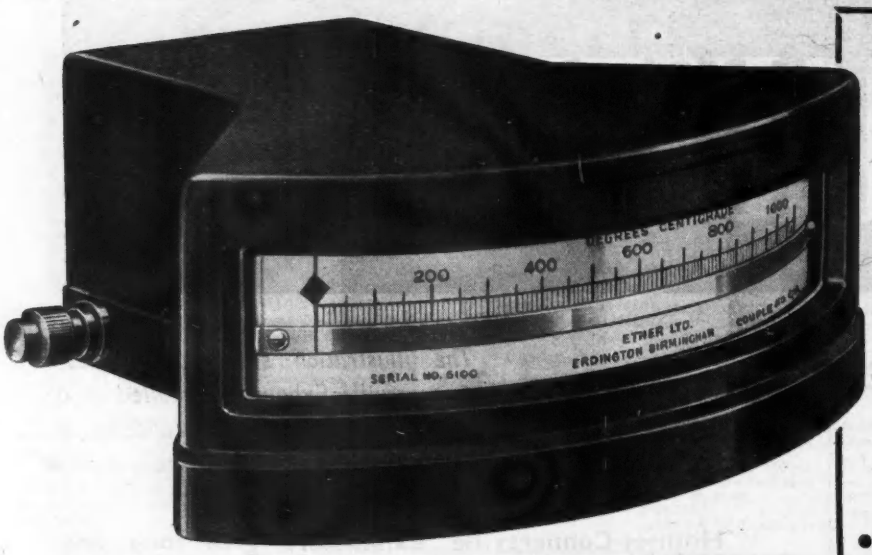
your *protection* is the

"A&M" METER

ALDER & MACKAY LTD., NEW GRANGE WORKS, EDINBURGH, 11.



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For use where an accurate continuous indication of temperature is required up to 1600° C.

Operating on the Thermo-Electric principle, they are accurate, reliable, and will stand up to hardening shop conditions. *Send for List No. 136.*

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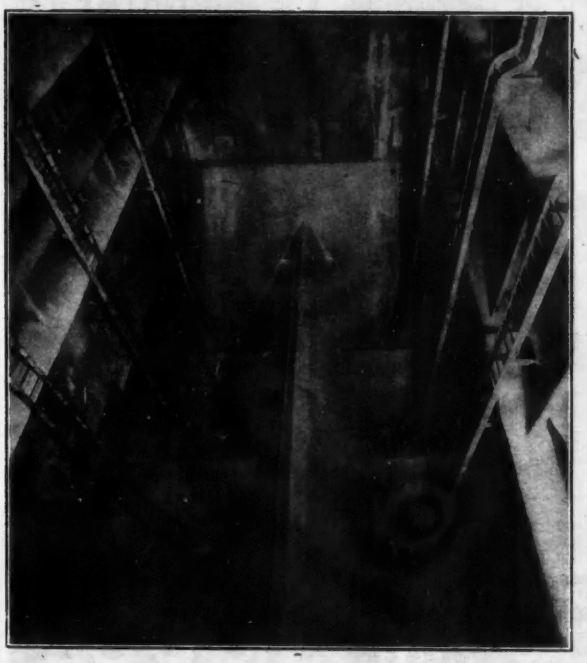
Gunite is PROTECTION against abrasion



Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have particular value.

For lining coal bunkers and steel chimneys it is an ideal material, possessing great resistance to corrosion and protecting steel-work from the abrasive action of the raw coal.

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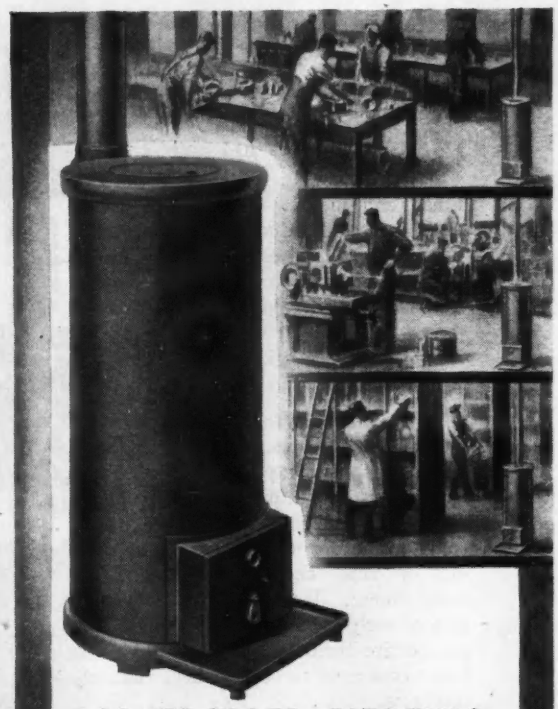

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Burning rate is accurately controlled.

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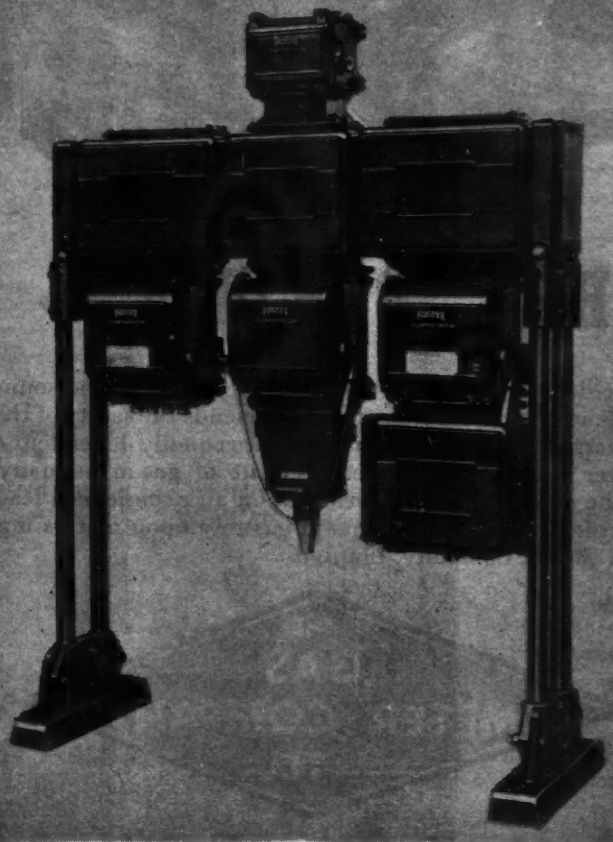

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Industry and the Domestic Front are equally dependent on the Gas Meter for an accurate measurement of gas in its many uses.

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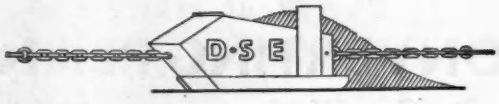

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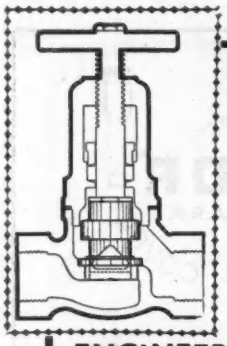

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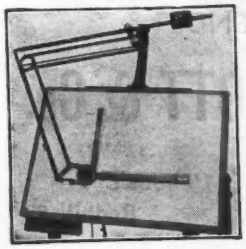

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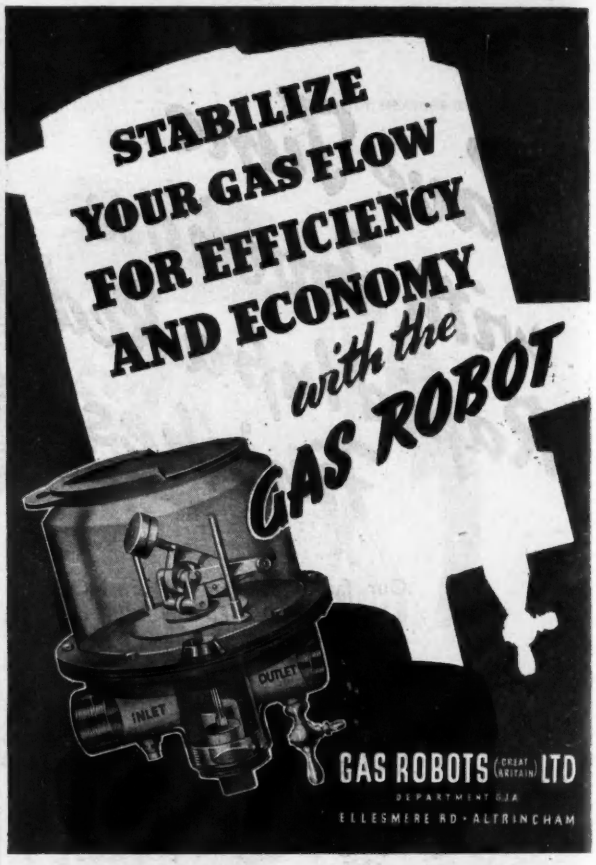

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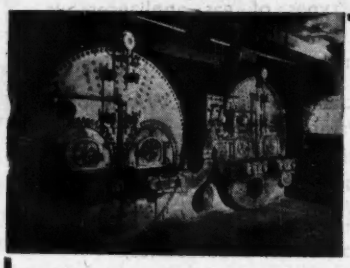

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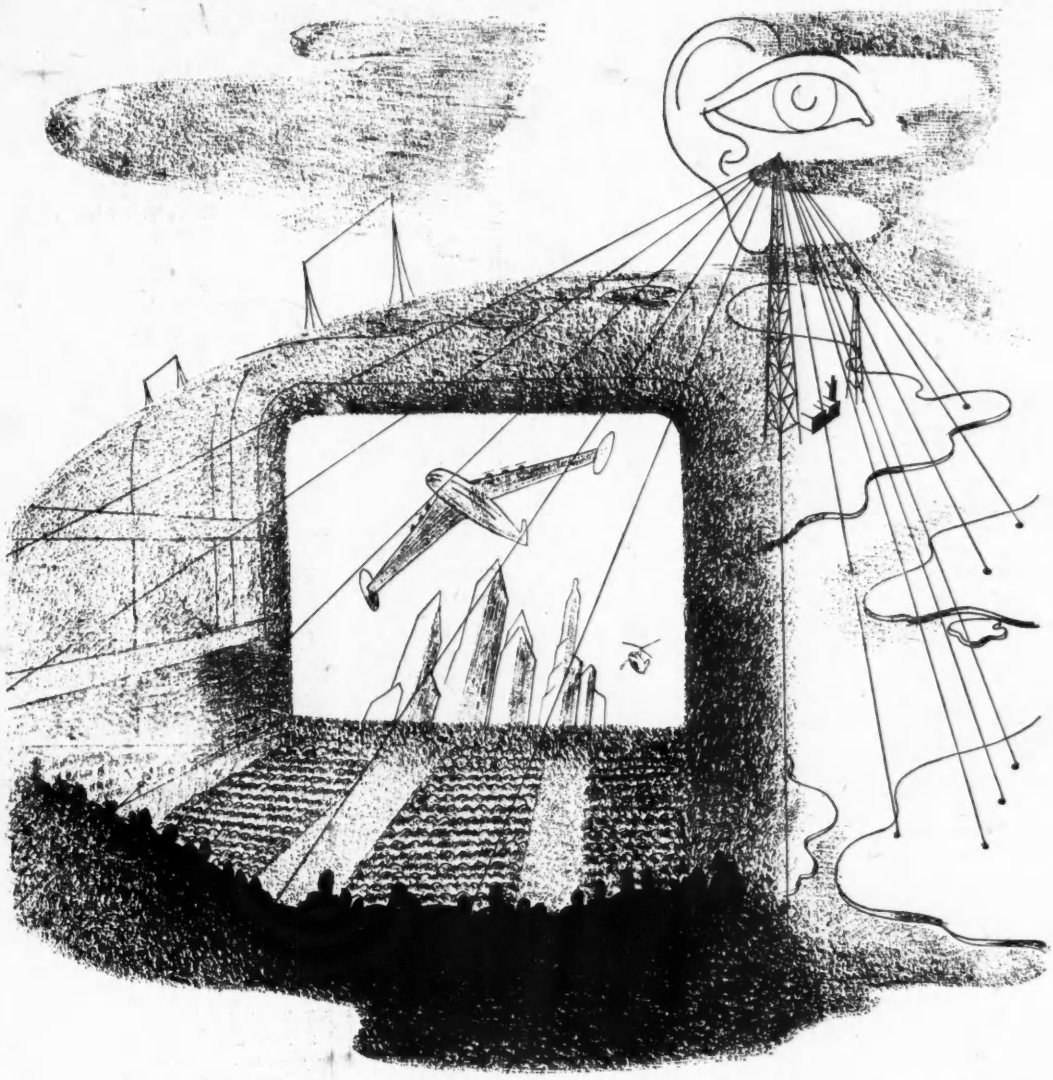

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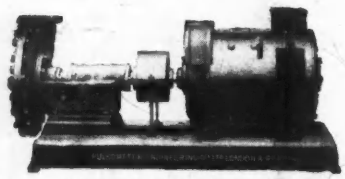

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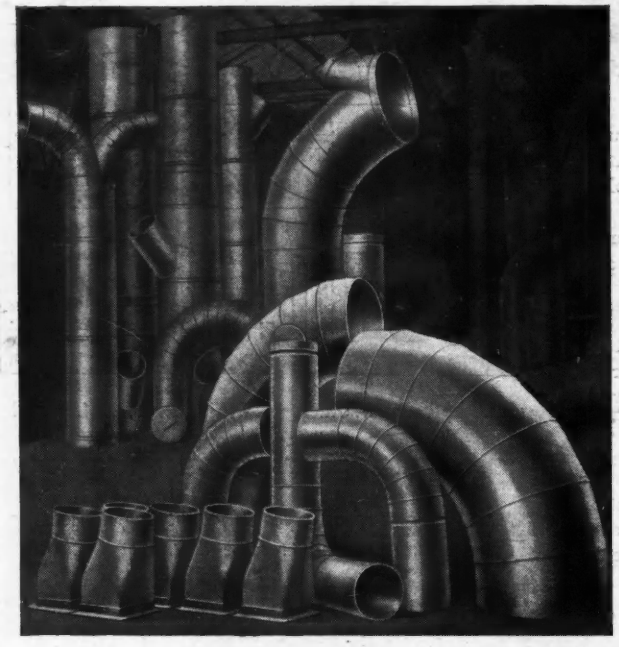

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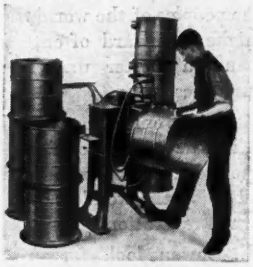

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